



# SERVICE MANUAL

Versione SW 2.xx

Rev.1.0 of 15/06/2007

*Automatic instrument for determining the erythrocyte sedimentation rate (ESR)*

*(Patented)*

(Diagnostic Device  -IVDD 98/79)



**Diagnostica Senese S.p.A**

## LIST OF REVISIONS

| MANUAL REVISIONS | DESCRIPTION OF MODIFICATION | APPR. |
|------------------|-----------------------------|-------|
| 1.0 of 06/2007   | Official Version            |       |

## MODELS

This manual applies to the following Ves Matic Easy model:

| DIESSE Code | Model description     |
|-------------|-----------------------|
| 10376       | VES MATIC EASY CE/CSA |

### TECHNICAL ASSISTANCE

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#### Standards applied in this document:

UNI EN 591 II Edition (November 2001)

CEI EN 61010-1 II Edition File 6290 (November 2001)

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## **1. GENERAL DESCRIPTION OF THE INSTRUMENT**

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## 1.1. OVERALL VIEW OF THE UNIT

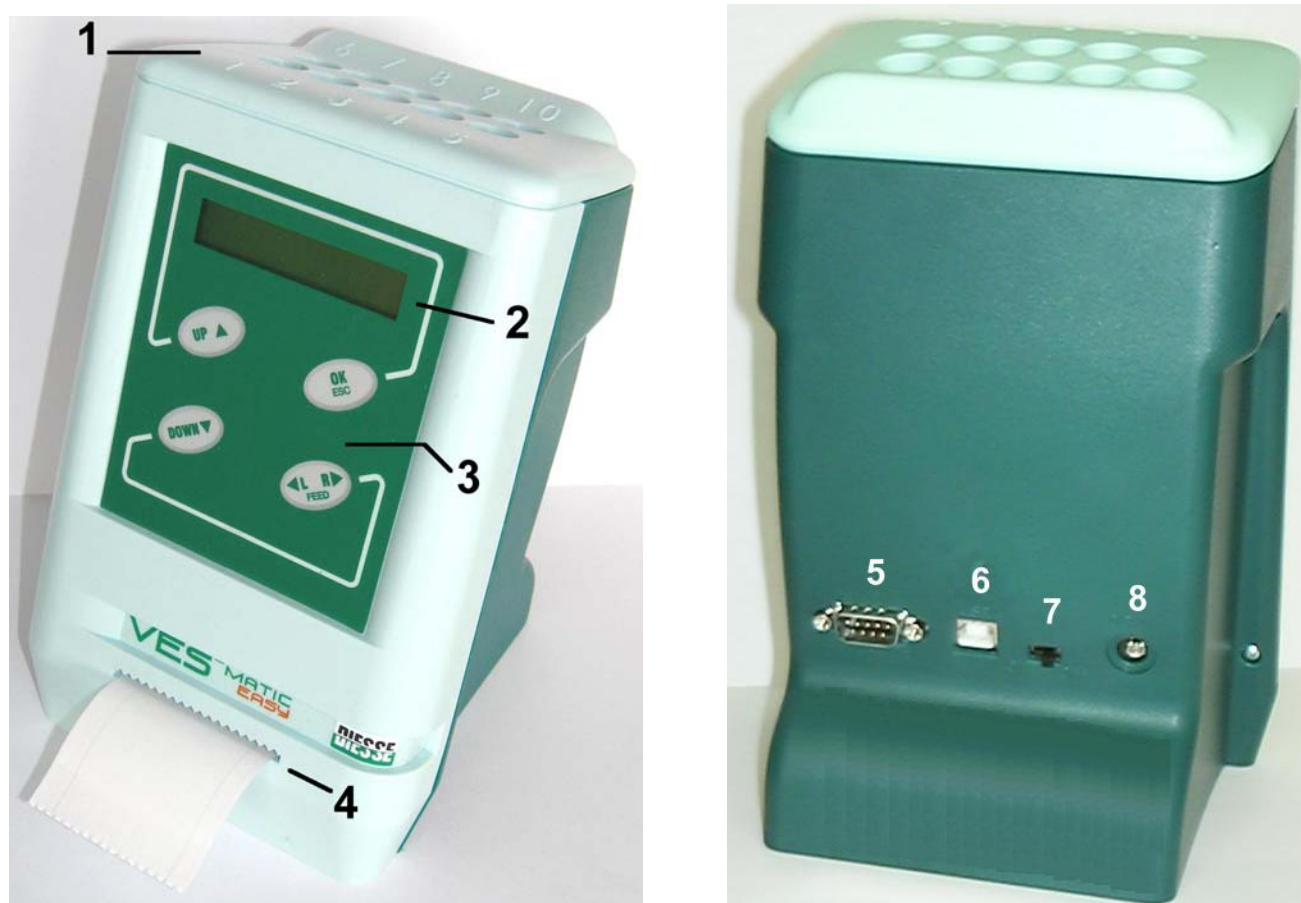
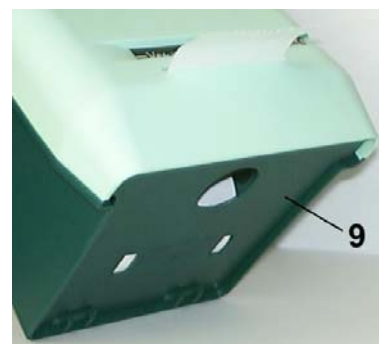


Fig. 1-1

### Legend:

- 1) Cuvette-holder with 10 numbered positions
- 2) Display
- 3) Keyboard
- 4) Printout-Paper slit
- 5) EXTERNAL BARCODE connector  
(External Barcode Reader)
- 6) USB connector
- 7) ON/OFF switch
- 8) DC IN socket for 9Vdc power supply
- 9) Paper-holder compartment



## 1.2. TECHNICAL SPECIFICATIONS

|                             |                                                                                                      |                      |
|-----------------------------|------------------------------------------------------------------------------------------------------|----------------------|
| Power supply                | 9Vdc@2A                                                                                              |                      |
| Dimensions                  | 143 x 218 x146 mm ( w x h x d )                                                                      |                      |
| Weigh                       | 1.2 Kg                                                                                               |                      |
| Ambient temperature         | Operational                                                                                          | from +15 to +35°C    |
|                             | Storage                                                                                              | from + 5°C to + 45°C |
| Relative humidity tolerance | from 20 to 80% without condensation                                                                  |                      |
| Central unit                | AVR ATMEGA128-16AC microprocessor                                                                    |                      |
| Display                     | LCD with Backlight, 16 characters x 1 row                                                            |                      |
| Cuvette-holder              | With 10 numbered recesses for the relative cuvettes                                                  |                      |
| Optical unit                | 10 pairs of opto-electronic elements in solid state (photodiode + phototransistor).                  |                      |
| Printer                     | Alphanumeric with thermal paper 58 mm wide, 36 characters per line, speed: 20 mm/sec.                |                      |
| Interfaces                  | USB                                                                                                  |                      |
| Class                       | II                                                                                                   |                      |
| Device safety               | CEI EN 61010-1 (Ed.2001-11);<br>CAN/CSA-C22.2 Nr.61010-1-04 (Ed.2004-07);<br>UL61010-1 (Ed.2004-07). |                      |
| EMC                         | CEI EN61326 (ED.2004-08)                                                                             |                      |
| Installation category       | II                                                                                                   |                      |



**Safety requirements and functional performances of the instrument are not assured if you use a different power supply from the one supplied in the package.**

## 1.3. CONTENT AND PACKAGE DIMENSIONS

### MATERIAL SUPPLIED WITH THE INSTRUMENT

The VESMATIC EASY is supplied with the following material:

- |                                                              |                         |
|--------------------------------------------------------------|-------------------------|
| ▪ 1 Operating Manual [English]                               | [Order Code: P30600650] |
| ▪ 1 "VESMATIC EASY"CD                                        | [Order Code: P30650050] |
| ▪ 1 Power Supply 9Vdc 2A Mod. ES18A09-P1J [MeanWell]         | [Order Code: P21440380] |
| ▪ 1 Power Cord 3x0.75 L=2m Plug SCHUKO 90° - C13             | [Order Code: P21890040] |
| ▪ 1 Power Cord SVT L=2m Male Plug USA / Female Plug VDE 'UL' | [Order Code: P21890370] |
| ▪ 1 USB 1.1 A-B M/M Cable (1.5mt)                            | [Order Code: P21890360] |
| ▪ 1 Thermal Roller Paper for Printer                         | [Order Code: P12300000] |
| ▪ 1 Packing-list                                             |                         |
| ▪ 1 Final Inspection Report                                  |                         |
| ▪ 1 Guarantee Certificate (for CAN/USA Market)               |                         |

## Package dimensions

|                  |    |      |
|------------------|----|------|
| WIDTH (box)      | cm | 30   |
| HEIGHT (box)     | cm | 19   |
| DEPTH (box)      | cm | 28   |
| GROSS WEIGHT     | g  | 2400 |
| PACKAGING WEIGHT | g  | 400  |



Do not throw away the original packaging in case of further transportation of the instrument in the future.

## 1.4. SHUTTING DOWN AND SHIPPING



Before shutting down and shipping the instrument it is recommended carrying out the following sanitising procedure:

- The instrument must be turned off and cleaned internally of all residues or spillage with a liquid detergent and left to dry.
- Use one of the ready-to-use spray cans of isopropyl alcohol available on the market.
- Spray well on the sample-holder.
- Leave turned off for at least one hour before beginning a new work cycle or any other type of operation on the instrument.



Instrument maybe damaged if dropped.

### SHIPPING

- Insert the instrument, the power supply unit and accessories into the box.
- Close the box.



If the instrument is being shipped to the manufacturer for repairs, affix a copy of the “Fault Report” form (contained in this document) to the outside of the box.

## **2. DISASSEMBLY PROCEDURE (and reassembly)**

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## 2.1. GRAPHICS

**Legend of graphic symbols used on the Instrument [Standard applied: EN980:2003].**



Instrument satisfying requirements of european directive on in vitro diagnostic medical devices (98/79/EC).



In vitro diagnostic medical device.



Instrument satisfying CSA standards for the Canadian and Usa market



Date of manufacturing of the unit.



Serial number of the unit.



Manufactured by.

**Legend of Electrical and Safety symbols used on the instrument:**



Attention, read the manual and observe the relative safety symbols.



WEEE: Disposal of Waste Electrical and Electronic Equipment - At the end of its life, this instrument should be disposed of according to separate waste collection provisions [2002/96/EC, 2003/108/EC]

**Legend of Symbols used on the document:**



WARNING, potential hazard of personal injury, all the conditions indicated in the associated text must be stored and understood before proceeding.



WARNING, potential danger of damaging the instrument all the conditions indicated in the associated text must be known and understood before proceeding.



ATTENTION, important information.



BIOHAZARD, danger of contamination with potentially infected substance.

## 2.2. PRELIMINARY TASKS ASSIGNED TO THE TECHNICAL SERVICE



Before any type of operation on the instrument:

- a) TURN OFF THE ON/OFF SWITCH ON THE UNIT.
- b) DISCONNECT THE INSTRUMENT FROM THE POWER SUPPLY IN ORDER TO PREVENT RISK OF CONTACT WITH ANY ENERGISED ELECTRICAL OR MECHANICAL PARTS.

**FAILURE TO OBSERVE THESE INSTRUCTIONS SHALL RELEASE THE MANUFACTURER OF THE VESMATIC EASY FROM ALL LIABILITY.**

### 2.3. EQUIPMENT / INSTRUMENTATION REQUIRED

- Multimetre - Mod.Fluke 8010A or equivalent.
- Set of screwdrivers.
- Set socket-head spanners.
- 5.5mm Plug socket spanner.
- 10 Cuvettes containing 2ml Latex [\*]
- 10 Cuvettes containing 3ml Latex [\*]

[\*: Diesse Code 10406: 1 cuvette with 2ml Latex + 1 cuvette with 3ml Latex]

### 2.4. DISASSEMBLY AND REASSEMBLY PROCEDURES

#### Disassembly procedure

- a) Follow the instructions in paragraph 2.2 points a) and b).
- b) Remove the lower lid code 10602170 (Pos.007-Tab.30003800), lift up the printing head (see point 3.2) and remove the paper from the printer.
- c) Use a screwdriver to unscrew the 4 screws M3x12 (Pos.203-Tab.30003800) anchoring the front panel code 30208601 (Pos.002-Tab.30003800) to the rear panel code 30208611 (pos.001-Tab.30003800).
- d) Ease out the upper lid (Pos.006-Tab.30003800) anchored to the side panels by the springs on the moulds.
- d) Disconnet the wiring attached to the Ves-Matic Easy Connection Board (Pos.101-Tab.30003800) in order to access the electrical and mechanical parts of the instrument.

#### Reassembly procedure

Follow the steps of the disassembly procedure in reverse.



Make sure to prevent the wires from becoming entangled in the mechanical parts during this phase.

### 3. CALIBRATIONS AND PERIODICAL CHECKS

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### 3.1. PROCEDURE FOR CALIBRATING THE VES MATIC EASY FOLLOWING DISASSEMBLY OR PERIODIC CHECKS.

#### 3.1.1. ACCESS TO THE SERVICE MENU

##### Starting up the system

##### PROCEDURE:

1. Turn on the instrument.
2. When the instrument turns on, it carries out an automatic check of its system:
  - Check Display.
  - Check Clock.
  - Check Data contained in the EEprom.
  - Check Motor Movement and Home Sensor.
  - Check Read sensors.
  - Check Printer.

During this phase the instrument model and the software version installed in the instrument will be displayed:

SW VERS.2.xx



In the event of any malfunctioning, the instrument will emit an acoustic signal and display an error message. Please refer to Chapter 5 – Intervention Procedure – for troubleshooting the fault.

SENSOR X KO

If this message is displayed when the instrument is turned on, do not use the position 'X' indicated for the processing of samples as the read sensor associated with this position may be damaged.

Use the key ▲ to display the list of damaged sensors and pass over to the Main Menu.

Once the initial self-testing is over, the following message will be displayed.

SELECT FUNCTION

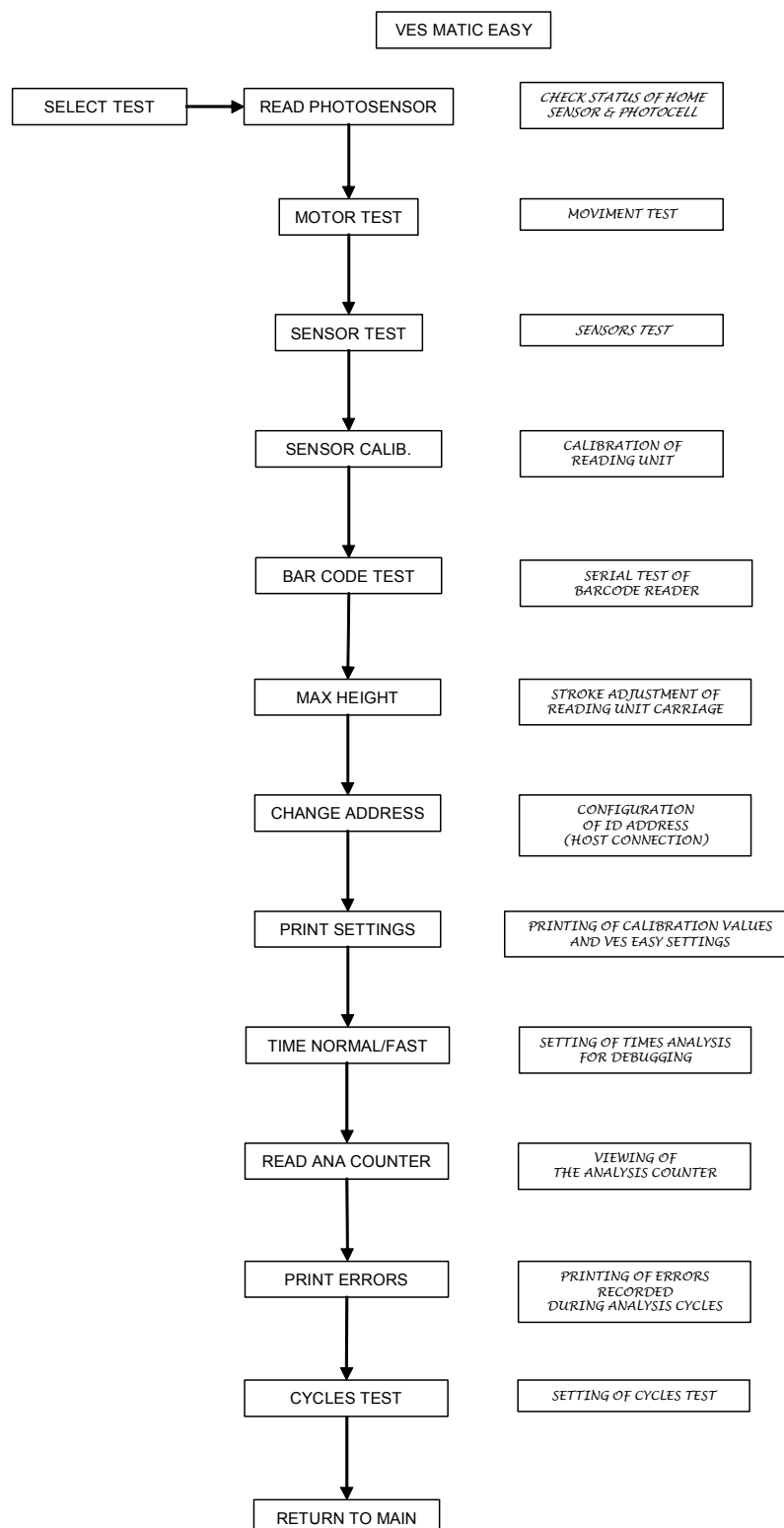
The instrument is now ready to perform the functions that will be selected.

##### Access to the Service Menu

1. In order to access the Service functions it is necessary to press in sequence the following keys in the Select Function:  
**OK 3 TIMES - ▲ 3 TIMES –OK TWICE.**
2. The following message will be displayed:

SELECT TEST

The SERVICE menu supplies a list of useful functions for the various calibration and testing operations described below:



To exit select RETURN TO MAIN MENU and press **OK**.

For testing and calibration it is necessary to use the printer, therefore it is recommended to check that the printer is working and that it contains paper.

### 3.1.2. TEST STATUS OF SENSORS & HOME PHOTOCELL

#### [READ PHOTOSENSOR]

This function allows for performing the first check of the status of the optical sensor (the software sets the current of the emitters at 20mA by default) and home photocell.

Useful function for the testing of the boards before mounting on the movement/analysis unit and for an additional check before closing the instrument with side safety panels.

#### Procedure:

1. Select the item 'READ PHOTOSENSOR' with the ▲ and ▼ keys from Select test menu and then press **OK**.
2. The instrument is set up for carrying out these tests with the carriage of the reading unit in two different positions:
  - with the reading unit in the home position (on standby)
  - with the reading unit in mid-stroke (by initially moving the motor).

As soon as this function is selected the software displays the following request:

MOTOR (YES = OK)

- Press **OK** to perform the test of the sensors and Home photocell with the carriage of the reading unit one third along the maximum stroke.
  - Press any key to perform the test in the Home position.
3. The sensors will be displayed in the following format:

LLLLL LLLLL L

Photograph of the status of the optical and mechanical sensors of the instrument.

L= Light-OPEN D= Dark-CLOSED

4. By performing simple manual operations, like inserting and extracting a test tube from one of the 10 positions in the test tube tray or blacking out the Home photocell, it is possible to check the functioning.

Press any key to return to the previous menu.

### 3.1.3. MOTOR TEST

This function allows for performing the first test for checking the motor movement; more specifically, it checks that the complete stroke has been carried out in the scheduled time (and preferably without losing the motor pitch\*) as well as checking that the home photocell functions correctly (in the case of errors the message ERROR READING will appear on the display or the number of STEPS LOST during the movement will be printed).

#### Procedure:

1. Select the item 'MOTOR TEST' from Select test and press **OK**.
2. The number of motor steps to be performed is requested:

CYCLE NUMBER 1

To set the number of cycles (max 20 cycles) :

- Use the ▲/▼ keys to change value of the units.
- Use the **Line Feed** key to increase by 10 the value to be set.

3. To confirm the value entered and start the cycle press **OK**.



The instrument allows a 30-second pause between each cycle.

\*It is foreseen that the instrument may lose several steps during the movement without however any affect on the quality of the readings. The motor strokes are to be considered as valid as long as the loss of the steps is  $\leq$  a 16 (corresponding to 0.5mm) (see Printing Report).

### 3.1.4. SENSOR TEST

#### [SENSOR TEST]

This function allows for checking the motor steps by measuring the height of the test tubes.

##### Procedure:

1. Select the item 'SENSOR TEST' from the Select test menu
2. Introduce 10 cuvettes containing the test strips into the test tube trays and press **OK**.
3. The instrument will perform a full stroke and displays the following message:

YYYYYY YYYYYY

Where Y = YES position occupied, value valid. N = Non present.

Press **OK** to return to the previous menu.

### 3.1.5. SENSOR CALIBRATION

To perform the calibration (fine tuning) of the sensors it is necessary to use 10 test tubes containing 3ml calibration latex [LOW] and 10 test tubes containing the 2ml calibration latex [HIGH]

The instrument foresees two calibration modes, either for single sensors or simultaneously for all 10 optoelectronic units.

##### Procedure for calibrating the 10 optoelectronic units:

- Select the item 'SENSOR CALIB.' from the Select test menu and press **OK**
- At the request 'ALL=OK SINGLE=UP' press **OK** to start the simultaneous calibration procedure.
- The instrument will take the reading carriage to mid-stroke and request the inserting of the test tubes with the 3ml calibration latex [LOW] 'INSERT LOW'
- Press **OK** once the test tubes have been inserted on LOW.
- The instrument will carry out a series of reading until, on lowering the current to the emitter sensor, it manages not to perforate the 3ml latex.
- At this stage the instrument will request the insertion of the test tubes containing the 2ml calibration latex [HIGH], 'INSERT HIGH', insert the test tubes and press **OK**.

- The instrument will carry out a series of readings until, via the adjustment of the emitter sensor current, it manages not to perforate the 2ml latex.
- The instrument calculates the mean value between the two readings of each group and memorises it in the EEPROM as well as printing a report.

Procedure for calibrating one single sensor:

- Select the item 'SENSOR CALIB.' from the Select test menu and press **OK**
- At the request 'ALL=OK SINGLE=UP' press **▲** to start the procedure for calibrating one single.
- The position of the sensor to be calibrated will appear on the display:

|               |
|---------------|
| SENSOR      1 |
|---------------|

- Use the **▲/▼** keys to select the position to be calibrated if different from the one displayed and press **OK** to start up the calibration procedure.
- The instrument will take the reading carriage to mid-stroke and request the inserting of the test tube with the calibration latex 3 [LOW] 'INSERT LOW'.
- Press **OK** once the test tube has been inserted on LOW.
- The instrument will carry out a series of reading until, on lowering the current to the emitter sensor, it manages not to perforate the 3ml latex.
- At this stage the instrument will request the insertion of the test tubes containing the 2ml calibration latex [HIGH], 'INSERT HIGH', insert the test tube and press **OK**.
- The instrument will carry out a series of readings until, via the adjustment of the emitter sensor current, it manages not to perforate the 2ml latex.
- The instrument calculates the mean value between the two readings of the group calibrated and memorises it in the EEPROM as well as printing a report.
- The software is set for calibrating the next sensor after the one calibrated.

To exit from the Sensor Calibration menu press **Line Feed** (at any point of the programme except for during the calibration).

### 3.1.6. BARCODE TEST

This function allows for testing the communication and speed of the serial port and the external reader. It is advised only to connect the barcode reader to the instrument when turned off.

Procedure:

1. Select the item 'BAR CODE TEST' from the Select test menu,
2. Press **OK**: the following request will appear on the display:

|                |
|----------------|
| INSERT BARCODE |
|----------------|

3. Take a barcode and check that the code indicated on the display matches the one on the test tube.

Press **OK** to return to the previous menu.

### 3.1.7. ADJUSTING THE CARRIAGE STROKE READING

#### [MAX HEIGHT]

Adjustment necessary in the event of the following problem occurring: during the movement the read sensor carriage completes the upwards stroke and tries to go further than the maximum height, resulting in a loss of steps (Error printout) or fails to correctly complete the stroke up to the maximum height.

#### Procedure:

1. Select the item 'MAX HEIGHT' from the Select test menu,
2. Press **OK**, the max. height set in mm will be displayed.
3. Use the keys ▲/▼ to change the value (from 64mm min. to 72mm max.) with 0.1mm steps.
4. Use the **Line Feed** key to increase or decrease by 0.5mm at a time.
5. Press **OK** to save the value entered and return to the previous menu.

NB: The default value is 67.0 mm

### 3.1.8. CONFIGURATION OF ID No.

#### [CHANGE ADDRESS]

This menu allows for setting the ID number of the instrument to allow for identifying it during connection to the mains (Transmission Speed : 19200 bit/s; data format: 8 data bits, 1 stop bit and no parity bit).

#### Procedure:

1. Select the item 'CHANGE ADDRESS' from the Select test menu.
2. Press **OK**, and the address entered will appear on the display.

ADDRESS 0X00

3. Use the keys ▲/▼ to change the value of the units (hexadecimal, from 0 to F).
4. Use the **Line Feed** line to increase the value to be set by 10 hexadecimals.
5. Press **OK** to save the value entered and return to the previous menu.



The programming software is pre-arranged to communicate with the instruments with an ID number of '00'.

Therefore, before beginning to update the instrument it is advisable to carry out a check and if necessary set the ID number to 00. At the end of the programming restore the ID used.

### 3.1.9. PRINT SETTINGS

At the end of the calibrating, this function allows for obtaining a printout that summarises the settings of the instrument (including the calibration values of the sensors).

More specifically, it contains:

- the SW version installed
- the ID address and speed of the serial ports (USB and Barcode)
- date and time set

- the maximum stroke set for the reading carriage
- number of analysis completed by the instrument
- settings (refer to the Operating Manual)
- parameters of the QC set (refer to the Operating Manual)
- the current values of the 10 sensors (mA) memorised.

### 3.1.10. CONFIGURATION OF TEST MODE

#### [TIME NORMAL/FAST]

This menu allows for reducing the analysis time to the simple mechanical movements of the instrument and it is therefore possible to rapidly check the settings of the instrument during an analysis cycle.

##### Procedure:

1. Select the item 'TIME NORMAL/FAST' from the Select test menu,
2. Press **OK**, the mode set will appear on the display:

NORMAL

3. Use the key **▲** to set FAST mode.
4. Press **OK** to save the value entered and return to the previous menu.



These ANALYSIS CYCLES ARE NOT VALID for scientific purposes

Turn off and turn on the instrument again to restore normal functioning.

#### Method to verify the sensors efficiency using the FAST mode.

1. To use this rapid procedure it's necessary to prepare 2 (or 3 for F2 analysis) test-tubes with inside little sticks (in plastic or in metal) of various heights as shown in figure:

| A                 | B                                                                                     | C |
|-------------------|---------------------------------------------------------------------------------------|---|
|                   |                                                                                       |   |
| Sample <b>A</b> : | stick long <b>56mm</b> (near the sign level) that simulate a sample after the mixing. |   |
| Sample <b>B</b> : | stick long <b>50mm</b> that simulate a sample after one hour.                         |   |
| Sample <b>C</b> : | stick long <b>30mm</b> that simulate a sample after two hour.                         |   |

2. Select the ESR F1 ANALYSIS from the SELECT FUNCTION menu.
3. Introduce the tube **A** and start a cycle type **F1**.
4. Wait that the instrument executes the two reference readings, remove the sample **A** and insert the sample **B**.
5. After the reading at the first hour, the instrument prints the result.

- Repeat this procedure for all 10 positions of the Ves Matic Easy and verify that the result is the same (+/-3) for each position.

### 3.1.11. ANALYSIS COUNTER

This menu allows to visualize the total number of analysis executed from the instrument.  
 (this data is not modifiable from software).

Procedure:

- Select the item 'READ ANA COUNTER' from the Select test menu,
- Press **OK**, the value will appear on the display:

|         |   |
|---------|---|
| COUNTER | 0 |
|---------|---|

- Press a key to return to the previous menu.

### 3.1.12. PRINT ERRORS

This function sends to the printer the report containing the last 20 errors recorded by the instrument.

Procedure:

- Select the item 'PRINT ERROR' from the Select test menu
- Press **OK** to enable the print.

It's printed the date and the type of error for each recorded anomaly.

### 3.1.13. CYCLES TEST

This function allows the instrument to execute n cycles (programmable) of analysis.

Use 10 test-tubes containing the test stick (Height:56mm) and insert them in all positions of the sample-holder for the test before starting the cycles.

Procedure:

- Select the item 'CYCLES TEST' from the Select test menu and press **OK**.
- The instrument executes the print of the settings before starting the test procedure.
- The number of cycles to be performed by the instrument is requested:

|                |
|----------------|
| CYCLE NUMBER 1 |
|----------------|

To enter the number of cycles (ESR II nr°max 250):

- use ▲/▼ to change the unit value.
  - use **Line Feed** to increase the value to be set by 10 points use.
- To confirm the value entered and start the cycles press **OK**.

The test can be aborted at any time by pressing ▲ and **OK** simultaneously. When the question "ARE YOU SURE?" is displayed on the screen, press **OK** to confirm.

At the end of the procedure, the instrument prints the final report and automatically the software returns to the previous menu.

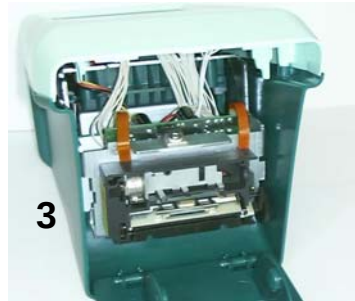
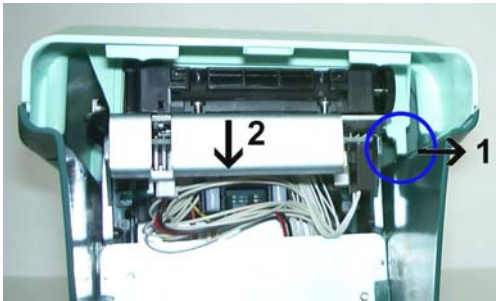
### 3.2. CLEANING THE PRINTER HEAD

To clean the printer head follow the steps below:

1. Disconnect the instrument from the power supply.
2. Carefully ease the instrument over onto its back and open the printer compartment.



3. Lift up the lever indicated in figure (1) to unhook (2) and tip up (3) the printing device.

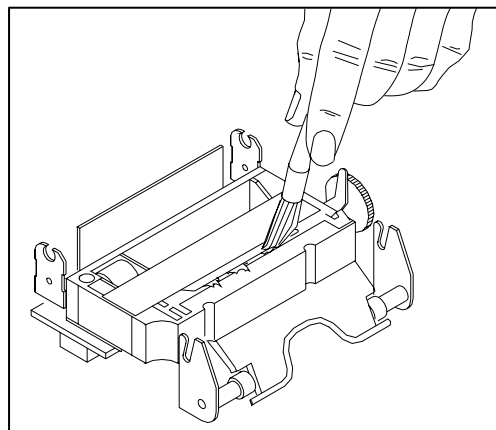


3. Lift up the printer head by raising the side lever.



4. Finally, proceed with the removal of the ends of the paper and clean the head.

**N.B.:** For removing of the paper and cleaning **only ever use products designed specifically for printer heads.**



Follow the above steps in reverse in order to reassemble the printer again.

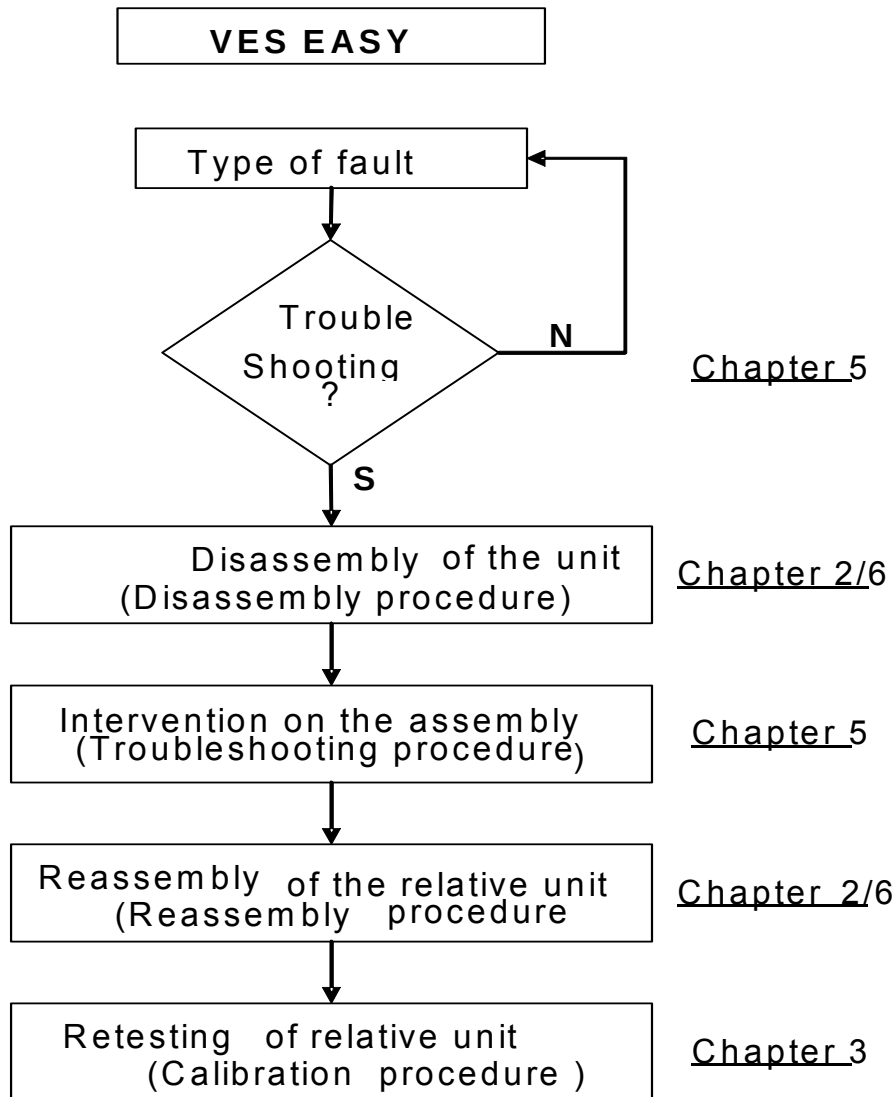
*In order to replace the paper refer to chapter 5 of the Operating Manual.*

## 4. LEARNING ABOUT THE UNIT- DESCRIPTION OF THE MAIN MODULES

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#### 4.1. LEARNING ABOUT THE UNIT

1. Follow the instructions in paragraph 2.2.
2. Open the safety guard of the unit as indicated in paragraph 2.4.
3. Gain access to the assemblies relating to the various procedures enclosed (Flow Chart no.1).



Flow-Chart n°1

## 4.2. CPU BOARD

### 4.2.1. Description of the module

The CPU board allows for controlling and managing all the peripheral units connected to the same, processing the data supplied regarding the read sensor boards and calculates the Westergren value at the 1<sup>st</sup> and 2<sup>nd</sup> Hours and the Katz index of every sample examined.

This is mainly subdivided into the following blocks:

- 1) MPU and ADDRESS/DATA BUS CONTROL block [U2- ATMEGA 128]  
 This block consists of microcontrollers that carry out the functions dictated by the programme residing in the same. It has a 16 Mhz system clock and a bus speed of 16 Mhz (speed of carrying out an operation).
- 2) MEMORY block [U2]  
 FLASH-Eprom Integrated in the microprocessor where the management programme is housed, the capacity of which is 128 KByte x 8Bit where the MPU transfers data or variable in a temporary manner with entirely random access.

### 4.2.2. Applicable documentation

|          |                                                         |        |
|----------|---------------------------------------------------------|--------|
| 20010140 | VES MATIC 10 / EASY interconnection diagram             | (6.4.) |
| 20103292 | Electrical diagram of the VES MATIC 10 / EASY CPU BOARD | (7.1.) |
| 30119871 | Layout of the VES MATIC 10 / EASY CPU BOARD             | (7.1.) |

### 4.2.3. Access to single modules

- a) Turn off the instrument and disconnect from the power supply.
- b) Access the unit as indicated in paragraph 2.4.
- c) Unscrew the 4 screws M3x12 (Pos.203-Tab.30003800) and disassemble the analysis handling unit 30208221 (Pos.004-Tab.30003800) and the printer unit 30208230 (Pos.005-Tab.30003800).
- d) Unscrew the 6 screws M3x8 (Pos.202-Tab.30003800) anchoring the Ves-Matic CPU 10 / Easy board, code 30119871 (Pos.100-Tab.30003800) to the front panel (Pos.002-Tab.30003800).
- e) Disconnect the wires connected to the board and proceed with the replacement of a new CPU.
- f) Repeat the above steps in reverse to reassemble instrument.



In the event of replacing CPU board it will be necessary to carry out a new CALIBRATION and FINE TUNING of the instrument (Chapter 3)

## 4.3. VES EASY CONNECTION BOARD

### 4.3.1. Description of the module

The Ves-Matic 10 / Easy connection module consists principally of the integrated LM7805 that generates 5Vdc on the board, necessary for the functioning of the CPU board.

Moreover, there is also a power supply connection for the printer on the board, and the connectors for interfacing with external equipment [USB-EXTERNAL BARCODE].

### 4.3.2. Applicable documentation

|          |                                                           |        |
|----------|-----------------------------------------------------------|--------|
| 20010140 | VES MATIC 10 / EASY interconnection diagram               | (6.4.) |
| 20103311 | Electrical diagram of the VES MATIC 10 / EASY CONNECTIONS | (7.2.) |
| 30120011 | Layout of the VES MATIC 10 / EASY CONNECTION BOARD        | (7.2.) |

### 4.3.3. Access to single modules

- a) Turn off the instrument and disconnect from the power supply.
- b) Access the unit as indicated in paragraph 2.4.
- c) Unscrew the 2 screws M3x8 UNI5931 (Pos.206-Tab.30003800) and the screw M3x6 UNI5931 (Pos.205-Tab.30003800) to remove the Connection Board (Pos.101-Tab.30003800).
- d) Proceed with the replacement of the board.
- e) Repeat the above steps in reverse to reassemble the instrument.



During the reassembly phase pay attention to the spacer rings (Pos.201-Tab.30003800) for isolating the board from the metal brackets of the rear unit 30208611 (Pos.001-Tab.30003800)

## 4.4. VES10/ESAY SENSOR AND HOME PHOTOCELL READING BOARDS

### 4.4.1. Description of the module

The 2 read sensors read each of the heights of the blood columns contained in the 5 test tubes (from 1 to 5 cod. 30119990 and position 6 to 10 code 30120000) and transform the optic signals acquired into electrical signals which they send to the MPU of the CPU board for being processed.

The Home photocell establishes the rest position of the Analysis Handling Unit.

### 4.4.2. Applicable documentation

|          |                                                     |        |
|----------|-----------------------------------------------------|--------|
| 20010140 | VES MATIC 10 / EASY interconnection diagram         | (6.4.) |
| 20103300 | Electrical diagram of the V.10 / V.EASY READ SENSOR | (7.3.) |
| 30119990 | Layout of FRONT V.10 / V.EASY READ SENSOR BOARD     | (7.3.) |
| 30120000 | Layout of REAR V.10 / V.EASY READ SENSOR BOARD      | (7.3.) |
| 30121610 | Layout of WIRED PHOTOCELL                           | (7.4.) |

### 4.4.3. Access to single module

- Turn off the instrument and disconnect from the power supply.
- Access the unit as indicated in paragraph 2.4.

#### Replacing the Read sensor Boards

- Use a Phillips screwdriver to unscrew the 2 screws M2.5x6 (Pos.202-Tab.30208221) and remove the Sensor le Sensor Boards (Pos.101/102-Tab.30208221)
- Disconnect the wiring connected to the same.
- Proceed with the replacement and reassembly following the steps above in reverse.

#### Replacing the Home photocell

- Use a 5.5mm plug-socket spanner to remove the nuts M3 (Pos.210-Tab.30208221) anchoring the photocell wiring to the analysis stand (Pos.001-Tab.30208221).
- Disconnect the wiring on the CPU Board side.
- Reassemble a new photocell using the 2mm spacers (Pos.204-Tab.30208221) and reconnect it to the CPU board.



During the reassembling phase make sure to centre the photocell with respect to the tongue of the limit switch located on the bottom of the rear reading stand (Pos.005-Tab.30208221).

- Clamp the wires together with a strap.

## **4.5. PRINTER INTERFACE MODULE.**

### **4.5.1. Description of the module**

The Printer Interface (pos. 083), consisting principally of an integrated circuit (U1) of the ATMEL AT908515 type, has the task of managing the printing operation and the serial communications with the CPU board of the instrument.

The management of the printing device involves the feeding of the paper, management of the end-of-paper and head raised sensors, and the control of the dots of the thermal head.

### **4.5.2. Applicable documentation**

|          |                                             |        |
|----------|---------------------------------------------|--------|
| 20010140 | VES MATIC 10 / EASY interconnection diagram | (6.4.) |
| 20102462 | Small WT01 Printer Interface diagram        | (7.5.) |
| 30111340 | Small WT01 Printer Interface board layout   | (7.5.) |

### **4.5.3. Access to single module**

- a) Turn off the instrument and disconnect from the power supply.
- b) Access the unit by opening the lid as indicated in chapter 2.
- c) Detach the power supply cable connected to the connector CN11.
- d) Detach the serial connection cable connected to the CN12.
- e) Remove the safety guard pos. 004 unscrewing the screws in positions 217 and 219.
- f) Extract the Interface board of the module by removing the screws marked on the layout 30111340 of the board pos. 082
- g) Proceed with the replacement of the components affected by the various faults as indicated in point 5.4.6.

## 5. TROUBLE-SHOOTING FOR SINGLE FAULTS

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## 5.1. ANALYSIS OF THE FAULTS

The faults indicated in the following paragraphs refer to the troubleshooting procedures performed for each individual fault in order to highlight the types of action to be taken in the case of faults.



After any type of signalling of an Error it is recommended to:

- Repeat the entire operation at least once more in order to ascertain that the error is not due to external causal factors, like the cutting off or momentary fluctuation in the power supply for example.
- Check the setting parameters wherever possible.
- Check the continuity of the connections before proceeding with any type of replacement.

Apart from carrying out command and control operations of the peripherals, the C.P.U. also constantly monitors the most important parts of the instrument.

Whenever a fault is detected the process in progress is automatically stopped and an acoustic signal given while a message appears on the screen at the same time, signalling the type of fault or shortcoming occurring.

## 5.2. PROBLEMS/FAULTS AT START-UP

### 5.2.1. The unit fails to turn on

- a) Check that the power supply source is functioning.
- b) Check the power supply cable and the 'voltage detect' led of the power supply.
- c) Check the ON/OFF switch on the rear of the unit.
- d) Check the input and output power supply on the Connections board.

IN= 9Vdc [J1]

OUT= 5Vdc [CN1: pin 5 (5Vdc) and pin 8 (gnd)];

9Vdc [CN3: pin 1 (9Vdc) and pin 2 (gnd); CN1: pin 7 (9Vdc) and pin 8 (gnd)]

### 5.2.2. The unit turns on / Display KO-Keybaord KO

| <b>Overall effect</b>                | <b>- - - - - (DISPLAY ERROR)</b>                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Message on the display</b>        | <b>The unit fails to accept the command introduced by the KEYBOARD</b>                                                                                                                                                                                                                                                                                      |
| <b>Type of fault</b>                 | <ul style="list-style-type: none"> <li>On turning on, the display fails to show any messages and/or it shows strange characters and the instrument emits a prolonged acoustic signal.</li> <li>The display can be viewed by fails to light up.</li> <li>The display can be viewed but fails to accept any commands introduced from the keyboard.</li> </ul> |
| <b>Modules affected</b>              | CPU Board [see 4.2.]                                                                                                                                                                                                                                                                                                                                        |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the powers supplies towards the CPU board</li> <li>Make adjustments to the contrast with the R1 trimmer on the Board.</li> <li>Re-program the CPU Board [Attachment B: Updating of Software] after to have power-on the instrument with inserted Jumper JP5.</li> </ul>                                        |
| <b>Corrective Action to be taken</b> | <ul style="list-style-type: none"> <li>Replace the CPU Board code 30119871</li> </ul>                                                                                                                                                                                                                                                                       |

### 5.2.2. The unit turns on / Initial reset KO

The unit turns on but the self test is carried out incorrectly and either displays error messages or is not performed at all.

| <b>Overall effect</b>                | <b>Fails to carry out initial Reset-</b>                                                                                                                                                                                                                                                                                            |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Message on the display</b>        |                                                                                                                                                                                                                                                                                                                                     |
| <b>Type of fault</b>                 | <p>The instrument is not correctly energised.</p> <p>The Software has not been installed correctly.</p>                                                                                                                                                                                                                             |
| <b>Modules affected</b>              | <p>External Power supply</p> <p>CONNECTIONS board [see 4.3]</p> <p>CPU board [see 4.2]</p>                                                                                                                                                                                                                                          |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the input and output power supplies on the Connections board (Connectors CN1-CN3) , that is:<br/> IN= 9Vdc [J1]<br/> OUT= 5Vdc [CN1];9Vdc [CN3;CN1]</li> <li>Check the powers supplies on the CPU board.</li> <li>Reset the CPU board [Attachment B: Updating the Software]</li> </ul> |
| <b>Corrective Action to be taken</b> | <p><u>Depending on the fault, replace the following</u></p> <p>Power supply unit code 21440380.</p> <p>Power cord 21890040 (EU vers.) or 21890370 (.USA vers)</p> <p>Connections board code 30120011.</p> <p>CPU board code 30119871.</p>                                                                                           |

(The initial operations are carried out incorrectly)

| <b>Overall effect</b><br><b>Message on the display</b> | <b>RTC FAILURE (Clock error)</b>                                                                                                                                                                      |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | The programme fails to read or update the date and time. There is probably a communications breakdown between the component housing the programme and the component that memorises the date and time. |
| <b>Modules affected</b>                                | CPU board [4.2.]                                                                                                                                                                                      |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU Board.</li> <li>Reset the CPU Board [Attachment B: Updating of Software]</li> </ul>                                        |
| <b>Corrective Action to be taken</b>                   | <ul style="list-style-type: none"> <li>Replace the CPU Board code 30119871.</li> </ul>                                                                                                                |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>UNCALIBRATED (Sensors uncalibrated)</b>                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | The instrument has lost the adjustment values of the optoelectronic units. This is probably due to the fact that the programme fails to detect valid values in the EEPROM. BY pressing <b>OK</b> these values will be restored at the default values unless other problems also exist.                                                                         |
| <b>Modules affected</b>                                | CPU board [4.2.]                                                                                                                                                                                                                                                                                                                                               |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU board.</li> <li>Recalibrate the optoelectronic units and by turning off and turning on the instrument again, check that the calibration values are saved correctly [use the Print Settings functions].</li> <li>Reset the CPU Board [Attachment B: Updating of Software]</li> </ul> |
| <b>Corrective Action to be taken</b>                   | <ul style="list-style-type: none"> <li>Replace the CPU board code 30119871.</li> </ul>                                                                                                                                                                                                                                                                         |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>EEPROM FAILURE</b>                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | The instrument has lost the data relating to the analysis memorised in the archive. This is probably because on turning on the instrument the programme fails to detect valid values in the archive save on the EEPROM. By pressing <b>OK</b> the archive will be formatted (the Procedure last approximately 20 seconds).                                                                              |
| <b>Modules affected</b>                                | CPU Board [4.2.]                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU board.</li> <li>Carry out an analysis cycle with valid test tubes. At the end, turn the instrument off and on again and use the Print Archive function (see Operating Manual), to check that the analysis results are correctly save in EErpom.</li> <li>Reset the CPU Board [Attachment B: Updating of Software]</li> </ul> |

|                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corrective Action to be taken</b>                   | <ul style="list-style-type: none"> <li>Replace the CPU board code 30119870.</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |
| <b>Overall effect</b><br><b>Message on the display</b> | <b>SENSOR X KO / ALL SENSORS KO</b><br><b>(SENSOR ERROR in the Printing Report)</b>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Type of fault</b>                                   | This could be an electrical fault due to the sensors or the photocell of the limit switch of the motor.                                                                                                                                                                                                                                                                                                                                  |
| <b>Modules affected</b>                                | CPU Board [4.2.]<br>V10 / VEASY FRONT AND REAR READ SENSOR BOARD [4.4]<br>WIRED PHOTOCCELL [4.4.]                                                                                                                                                                                                                                                                                                                                        |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU board.</li> <li>Check the continuity of the connections between the CPU Board and the Read Sensor Board and between the CPU Board and the wired Photocell</li> <li>Carry out a check of the status of the Home photocell and the optoelectronic units (Use the READ PHOTSENSOR function with the carriage raised to a third of its maximum height)</li> </ul> |
| <b>Corrective Action to be taken</b>                   | <u>Depending on the fault, replace</u><br>V10 Front Read Sensor Board code 30119990 (KO pos.1-5)<br>V10 Rear Read Sensor Board code 30120000 (KO pos.6-10)<br>Wired Photocell code 30121610<br>CPU Board code 30119871.                                                                                                                                                                                                                  |

|                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall effect</b><br><b>Message on the display</b> | <b>ERROR READING</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Type of fault</b>                                   | This is probably due either to the movement of the reading unit failing to finish within the limits established or the Home sensor of the reading unit being defective.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Overall effect</b><br><b>Message on the display</b> | <b>STEP ERROR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Type of fault</b>                                   | This message is shown when there is a jam of the reading unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Modules affected</b>                                | CPU board [4.2.]<br>PHOTOCCELL WIRED [4.4.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU board.</li> <li>Check the continuity of the connections between the CPU board and the Wired Photocell and between the CPU board and the Wired Motor code 30403020</li> <li>Make a check of the status of the Home photocell (use the READ PHOTSENSOR function with the carriage raised to a third of its maximum height)</li> <li>Carry out several of the test movements (using the Motor Test function) and check the correct sliding of the reading unit.</li> <li>Check the presence of mechanical jams</li> </ul> |

|                                      |                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Corrective Action to be taken</b> | <u>Depending on the fault, replace</u><br>Wired Motor code 30403020<br>Photocell Wired code 30121610<br>CPU board code 30119871. |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|

### 5.2.3. The unit turns on / Printer KO

| <b>Overall effect</b><br><b>Message on the display</b> | <b>INSERT PAPER (Insert paper in the Printer)</b>                                                                                                                                                                                                                      |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears when the software detects that there is no more paper in the printer.                                                                                                                                                                             |
| <b>Modules affected</b>                                | SMALL WT01 PRINTER INTERFACE BOARD [4.5.]                                                                                                                                                                                                                              |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"><li>▪ Replace the roll of paper in the printer (see point 5.3. of the Operating Manual)</li><li>▪ Check the continuity of the connections [CN3] between the Interface Printer Board and the printer (Pos.100-Tab.30208230)</li></ul> |
| <b>Corrective Action to be taken</b>                   | <u>Depending on the fault, replace</u><br>Printer board. WT01 code 30111340.<br>Printing device code 21430120.                                                                                                                                                         |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>HEAD DOWN (Printer head down)</b>                                                                                                                                                                                                                             |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears whenever the software detects the printer head raised.                                                                                                                                                                                      |
| <b>Modules affected</b>                                | SMALL WT01 PRINTER INTERFACE BOARD [4.5.]                                                                                                                                                                                                                        |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"><li>▪ Correctly position the head lever (see point 5.3. of the Operating Manual).</li><li>▪ Check the continuity of the connections [CN3] between the Interface Printer Board and the printer (Pos.100-Tab.30208230)</li></ul> |
| <b>Corrective Action to be taken</b>                   | <u>Depending on the fault, replace</u><br>Printer board. WT01 code 30111340.<br>Printer device code 21430120.                                                                                                                                                    |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>PRINTER ERROR ( Serial Printer error) or the printer fails to print correct characters</b>                                 |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears whenever the serial communication between the printer and the C.P.U. board is not carried out correctly. |
| <b>Modules affected</b>                                | SMALL WT01 PRINTER INTERFACE Board [4.5.]<br>CPU Board [4.2.]                                                                 |

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the power supplies on the CPU board and on the Printer Interface Board.</li> <li>Check the continuity of the connections between the CPU board [CN3] and the Printer Interface Board [CN12]</li> <li>Turn on the instrument again and after pressing the relative key in the Select Function menu, check that the printer performs a line-feed (feeding of the paper by one row)</li> <li>Check the signals of the serial communication on the CPU side and the Printer Interface side.</li> </ul> |
| <b>Corrective Action to be taken</b> | <u>Depending on the fault, replace</u><br>Printer board. WT01 code 30111340.<br>CPU board code 30119871.                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                      |                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall effect</b>                | <b>PRT DISABLED? (Printer Disabled?)</b>                                                                                                                                                                                                                                                                                                                                           |
| <b>Message on the display</b>        |                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Type of fault</b>                 | This message appears when the printer signals an error.                                                                                                                                                                                                                                                                                                                            |
| <b>Modules affected</b>              | -----                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>In order to avoid interrupting the analysis cycle in progress, the operator may disable the printer following the signalling of an error, by confirming with the <b>OK</b> key. Once the problem indicated has been solved, the results of the analyses can still be printed as they will have been saved in the EEPROM archive.</li> </ul> |
| <b>Corrective Action to be taken</b> | -----                                                                                                                                                                                                                                                                                                                                                                              |

|                                      |                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall effect</b>                | <b>Printer compressed</b>                                                                                                                                                                                                                                                                                       |
| <b>Message on the display</b>        |                                                                                                                                                                                                                                                                                                                 |
| <b>Type of fault</b>                 | The printer fails to feed the paper correctly into the device.                                                                                                                                                                                                                                                  |
| <b>Modules affected</b>              | SMALL WT01 PRINTER INTERFACE Board [4.5.]                                                                                                                                                                                                                                                                       |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the power supplies on the Printer Interface board</li> <li>Check that there are no residues of paper inside the printer head, otherwise carry out the cleaning indicated in paragraph 3.2.</li> <li>Check the rotation of the side knob (head engaging)</li> </ul> |
| <b>Corrective Action to be taken</b> | <u>Depending on the fault, replace the</u><br>Printer board WT01 code 30111340.<br>Printing device code 21430120.                                                                                                                                                                                               |

#### 5.2.4. The unit turns on / External connections KO

| <b>Overall effect</b><br><b>Message on the display</b> | <b>???? (Barcode reading error)</b>                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears when the reading of the sample identification number by an external barcode reader fails to acquire the codes or acquired them incorrectly.                                                                                                                                                                                                                                                              |
| <b>Modules affected</b>                                | CPU board [4.2.]<br>CONNECTIONS board [4.3]                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Checks recommended</b>                              | <ul style="list-style-type: none"> <li>▪ Check the status of the label bearing the barcode, and if necessary replace it and try again.</li> <li>▪ Check the power supplies on the CPU board and the output connectors of the Connections board.</li> <li>▪ Check the continuity of the connections between the CPU board and the Connections board.</li> <li>▪ Using the TEST function to check the Barcode Reader</li> </ul> |
| <b>Corrective Action to be taken</b>                   | <u>Depending on the fault, replace</u><br>CONNECTIONS board code 30120011.<br>CPU board code 30119871.                                                                                                                                                                                                                                                                                                                        |

### 5.3. TROUBLESHOOTING DURING THE OPERATING PHASE

| <b>Overall effect</b><br><b>Message on the display</b> | <b>SAMPLE ABSENT (Sample ABSENT)</b>                                                                                             |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears during printing due to the absence of cuvettes or in the presence of samples with haematocrit values < 15%. |
| <b>Modules affected</b>                                |                                                                                                                                  |
| <b>Checks recommended</b>                              | ▪                                                                                                                                |
| <b>Corrective Action to be taken</b>                   |                                                                                                                                  |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>EMPTY (Sample EMPTY)</b>                                                                                                                    |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears during printing whenever the instrument identified empty cuvettes or cuvettes with samples with haematocrit values < 15%. |
| <b>Modules affected</b>                                |                                                                                                                                                |
| <b>Checks recommended</b>                              | ▪                                                                                                                                              |
| <b>Corrective Action to be taken</b>                   |                                                                                                                                                |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>LOW (Sample LOW)</b>                                                                                                                        |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears during printing whenever the level of the sample is too low or with samples with haematocrit values < 15%.                |
| <b>Modules affected</b>                                |                                                                                                                                                |
| <b>Checks recommended</b>                              | ▪ Correctly fill the cuvette with the same blood sample following the instructions in the illustrative leaflet enclosed in the cuvette packet. |
| <b>Corrective Action to be taken</b>                   |                                                                                                                                                |

| <b>Overall effect</b><br><b>Message on the display</b> | <b>HIGH (Sample HIGH)</b>                                                                                                                                     |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Type of fault</b>                                   | This message appears during printing whenever the level of the sample is too high.<br>This may also be due to a fault in the optoelectronic elements.         |
| <b>Modules affected</b>                                |                                                                                                                                                               |
| <b>Checks recommended</b>                              | ▪ Reduce the contents of the cuvette following the indications in the illustrative leaflet enclosed in the cuvette packet, seal well and repeat the analysis. |
| <b>Corrective Action to be taken</b>                   |                                                                                                                                                               |

|                                      |                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall effect</b>                | <b>***</b>                                                                                                                                                                                                                                                                                                              |
| <b>Message on the display</b>        |                                                                                                                                                                                                                                                                                                                         |
| <b>Type of fault</b>                 | <p>This message is printed whenever there are discrepancies in the readings, that is. Whenever the value of the VES 1h is &lt; of the value of the reference reading or whenever the value of the VES 2h is &lt; of the value of the VES 1h.</p> <p>This may also be due to a fault in the optoelectronic elements.</p> |
| <b>Modules affected</b>              |                                                                                                                                                                                                                                                                                                                         |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the status of the sample inside the test tube (e.g. if coagulates are present). Correctly insert the test tube into the sample holder and repeat the analysis.</li> </ul>                                                                                                  |
| <b>Corrective Action to be taken</b> |                                                                                                                                                                                                                                                                                                                         |

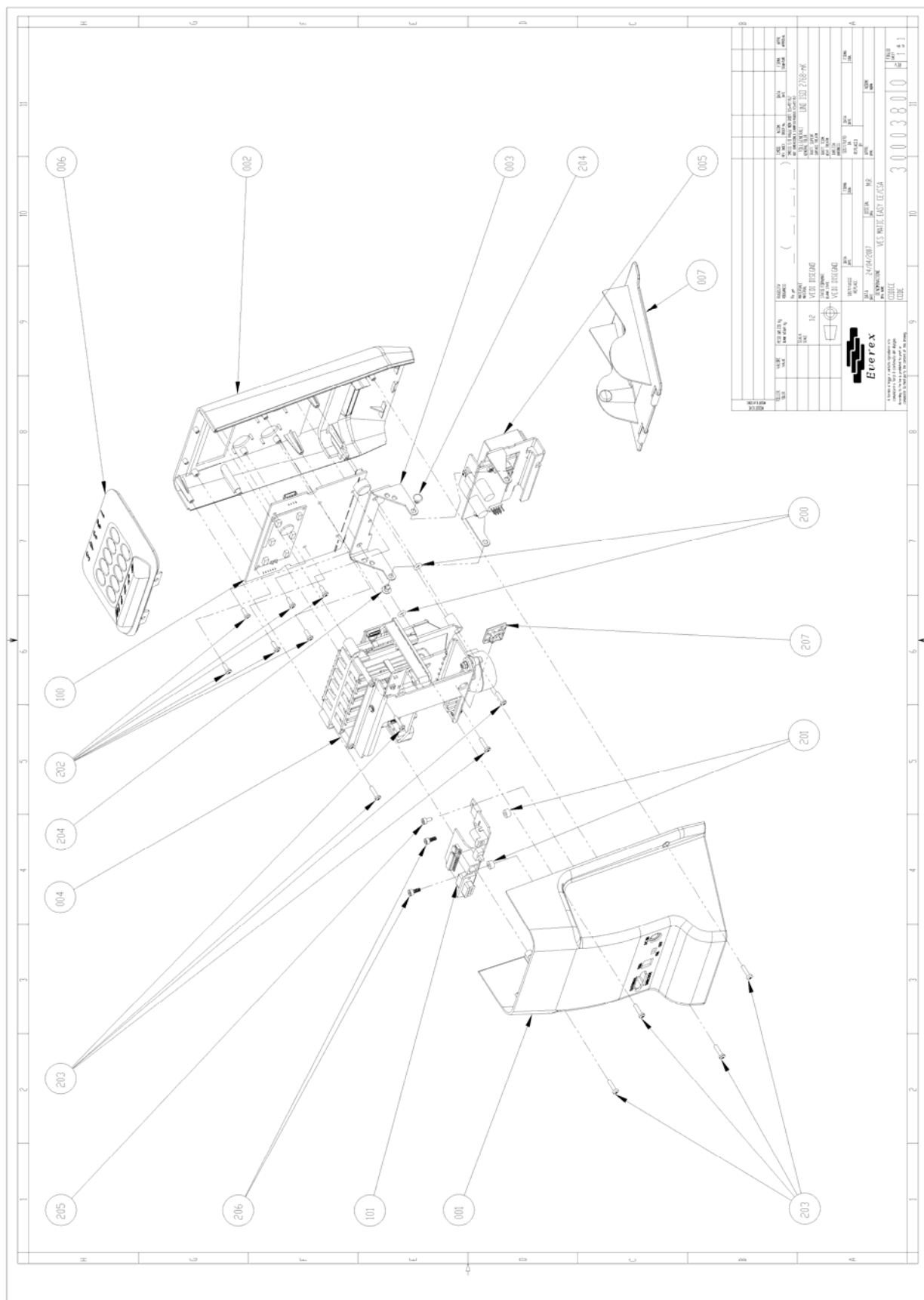
|                                      |                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall effect</b>                | <b>!! ANALYSIS ABORTED !!</b>                                                                                                                                                                                          |
| <b>Message on the display</b>        |                                                                                                                                                                                                                        |
| <b>Type of fault</b>                 | <p>This is printed whenever the work cycle has been interrupted or an analysis cycle is launched without having introduced the samples into the sample holder.</p>                                                     |
| <b>Modules affected</b>              |                                                                                                                                                                                                                        |
| <b>Checks recommended</b>            | <ul style="list-style-type: none"> <li>Check the status of the sample inside the test tube (e.g. if coagulates are present). Correctly insert the test tube into the sample holder and repeat the analysis.</li> </ul> |
| <b>Corrective Action to be taken</b> |                                                                                                                                                                                                                        |

## 6. EXPLODED DRAWINGS AND COMPONENT LISTS FOR UNITS

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## 6.1. VES MATIC EASY UNIT (30003800)

Exploded drawing



### Component list

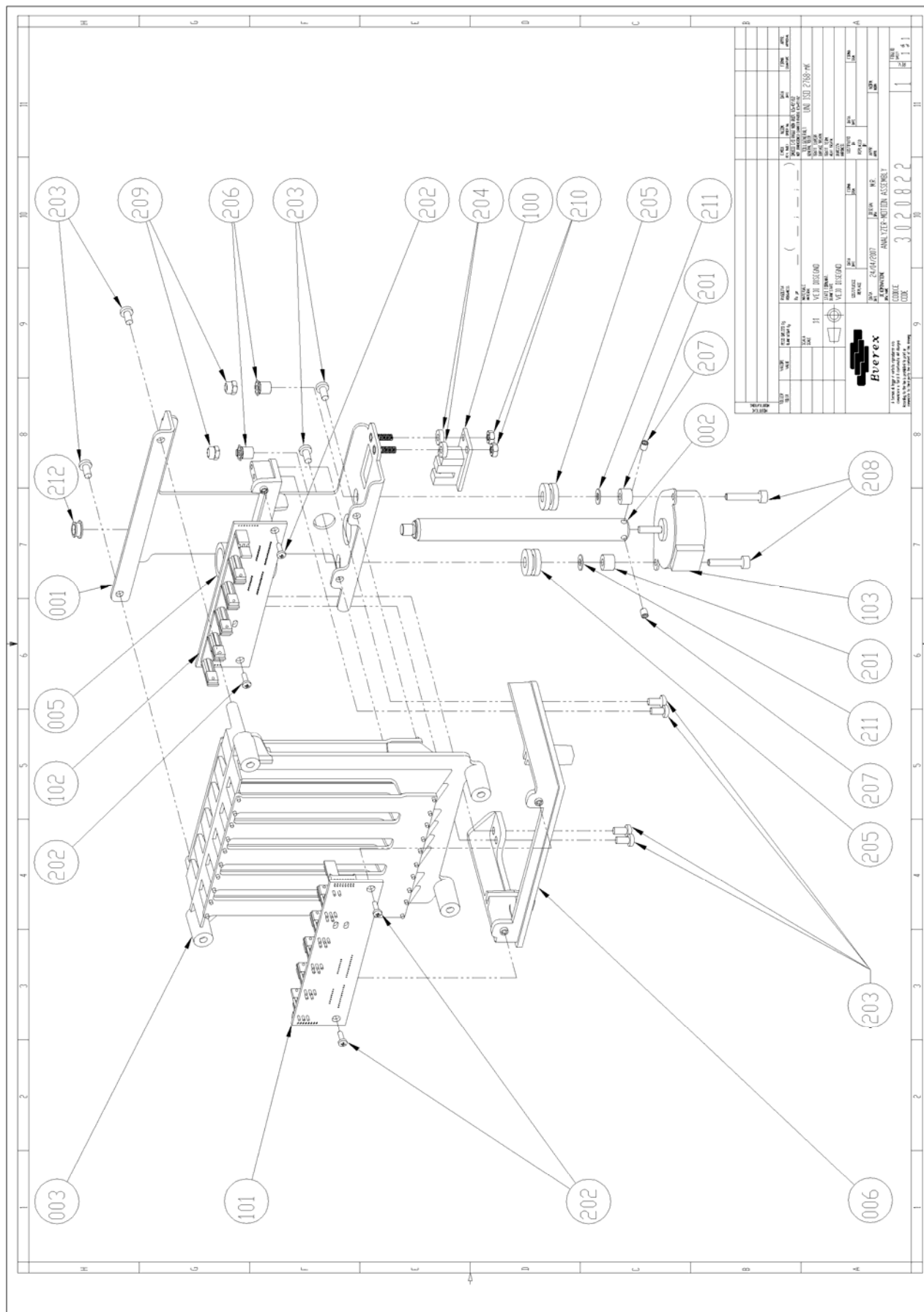
| <u>Ref.</u> | <u>Code</u> | <u>Description</u>                              | <u>Remarks</u> |
|-------------|-------------|-------------------------------------------------|----------------|
| 001         | 30208611    | COMPLETE REAR PANEL REV.1                       |                |
| 002         | 30208601    | COMPLETE FRONT PANEL VES EASY                   |                |
| 003         | 10341621    | PRINTER REVOLVING BRACKET                       |                |
| 004         | 30208220    | ANALYSIS HANDLING UNIT REV.1                    |                |
| 005         | 30208230    | VES-MATIC 10 / EASY PRINTER UNIT                |                |
| 006         | 10602160    | UPPER LID                                       |                |
| 007         | 10602170    | LOWER LID                                       |                |
| 100         | 30119871    | VES-MATIC 10 / EASY CPU BOARD                   |                |
| 101         | 30120011    | VES-MATIC 10 / EASY CONNECTION BOARD            |                |
| 102         | 30120791    | VES-MATIC 10 / EASY CPU-SENSOR WIRING           | Ref.403 (6.4.) |
| 103         | 30120800    | VES-MATIC 10 / EASY CPU-INTERCONN. WIRING.      | Ref.405 (6.4.) |
| 104         | 30120811    | VES-MATIC 10 / EASY PRINTER POWER SUPPLY WIRING | Ref.406 (6.4.) |
| 105         | 30120821    | VES-MATIC 10 / EASY SERIAL PRINTER WIRING       | Ref.404 (6.4.) |
| 200         | 11000270    | O-RING 2018                                     |                |
| 202         | 1110H85Z    | TC ECO-SYN BN 82428 3x8 xTERMOPL. SCREWS        |                |
| 203         | 1110H90Z    | TC ECO-SYN BN 82428 3x12 xTERMOPL. SCREWS       |                |
| 204         | 1110H95Z    | LB-5 RICHCO TIGHTENING BUTTON                   |                |
| 205         | 11141174    | M3X6 UNI 5931 STAINLESS STEEL SCREWS            |                |
| 206         | 11141184    | M3X8 UNI 5931 STAINLESS STEEL SCREWS            |                |
| 207         | 20920010    | PAND.ABMM-AT/RICH.FTH-05A-RT AUTOAD. BASE       |                |
| 208         | 20920140    | TY-RAP 2,4x92mm RICH.WIT-E-18R FASCIA           |                |

### List of Accessories & Optionals

| <u>Ref.</u> | <u>Code</u> | <u>Description</u>                                 | <u>Remarks</u> |
|-------------|-------------|----------------------------------------------------|----------------|
| //          | 12300000    | H.MM L=57 D=50 ROLL OF THERMAL PAPER               |                |
| //          | 21890040    | POWER CORD 3x0.75 L=2m Plug SCHUKO 90° - C13       |                |
| //          | 21890360    | USB 1.1 A-B M/M 1.5mt CABLE                        |                |
| //          | 21890370    | PWR CORD SVT L=2m Male PlugUSA/Female PlugVDE 'UL' |                |
| //          | 21440380    | ALIM. MEAN-WELL ES18A09-P1J 9V 2A 'UL'             |                |
| //          | 30600650    | VES-MATIC EASY – OPERATING MANUAL IN ENGLISH       |                |
| //          | 30650050    | VES-MATIC EASY CD                                  |                |
| //          | 20550510    | Z-3080R9 BARCODE READER + CABLE CAB 50607          | Optional       |

## 6.2. ANALYSIS HANDLING UNIT- (30208221)

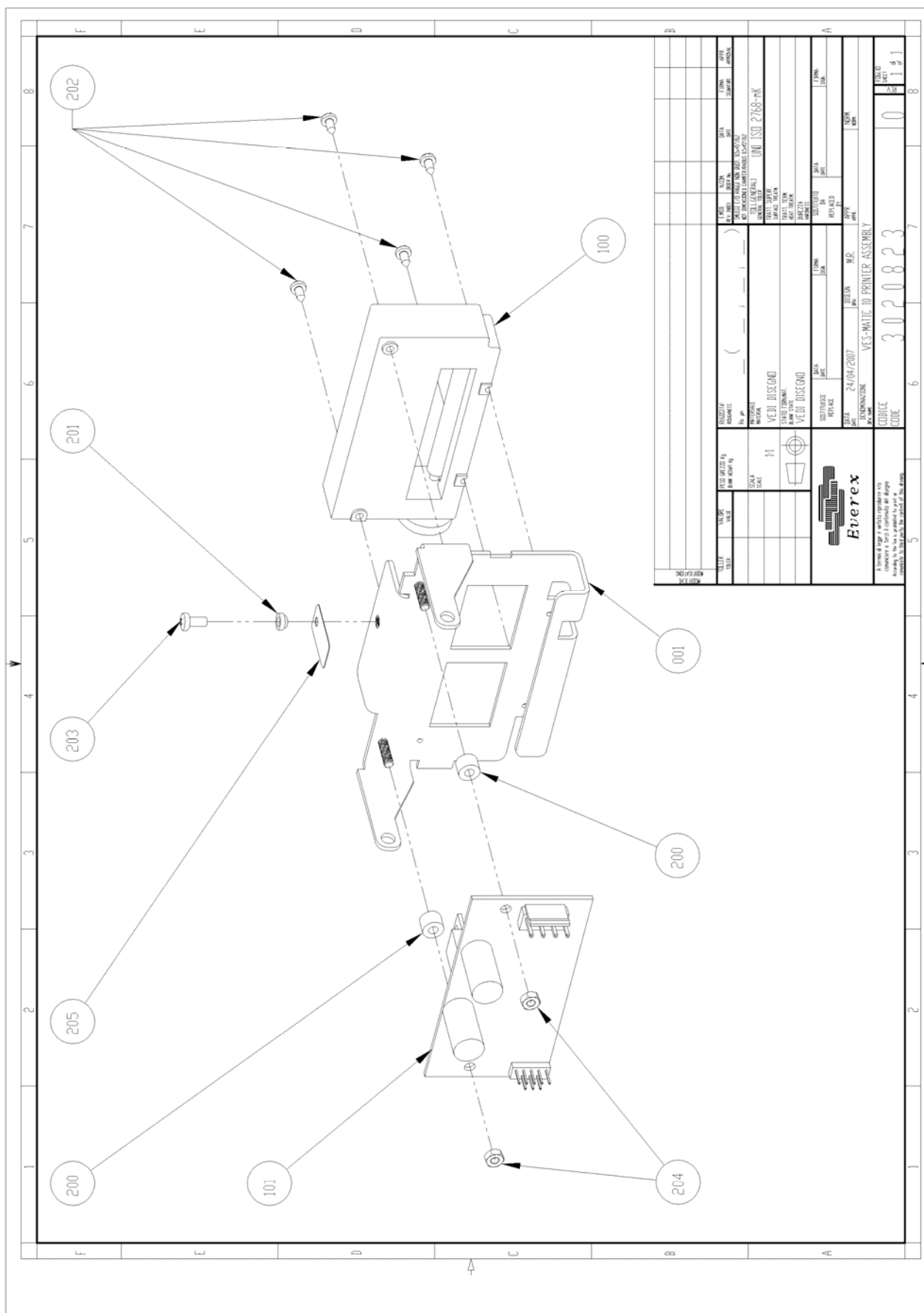
### Exploded drawing



### Component list

| <u>Ref.</u> | <u>Code</u> | <u>Description</u>                            | <u>Remarks</u> |
|-------------|-------------|-----------------------------------------------|----------------|
| 001         | 10341610    | ANALYSIS STAND                                |                |
| 002         | 10341730    | ANALYSIS UNIT SCREWS                          |                |
| 003         | 30208620    | ASSEMBLED TEST TUBE STAND                     |                |
| 005         | 10602201    | REAR READER STAND                             |                |
| 006         | 10602210    | FRONT READER STAND                            |                |
| 100         | 30121610    | WIRED PHOTOCELL BOARD                         | Ref.401 (6.4.) |
| 101         | 30119990    | VES-MATIC 10 / EASY FRONT SENSOR READER BOARD |                |
| 102         | 30120000    | VES-MATIC 10 / EASY REAR SENSOR READER BOARD  |                |
| 103         | 30403020    | WIRED PM35S-048 MOTOR STEP                    | Ref.402 (6.4.) |
| 104         | 30120781    | VES-MATIC 10 / EASY SENSOR WIRING JUNCTION    | Ref.400 (6.4.) |
| 201         | 1110080Z    | STEAB 5021/4////05 SPACER                     |                |
| 202         | 1110H87Z    | TC ECO-SYN BN 82428 2,5x6 xTERMOPL. SCREWS    |                |
| 203         | 1110H90Z    | TC ECO-SYN BN 82428 3x12 Xtermopl. SCREWS     |                |
| 204         | 1110H96Z    | Art. 341000 - 3460PA-02 SPACER                |                |
| 205         | 1110L02Z    | E.ZUBEHOR 486 RUBBER FAIRLEAD                 |                |
| 206         | 1110L03Z    | PTSO-S-M3-6 THREADED INSERT                   |                |
| 207         | 11141156    | M3X4 UNI 5923 STAINLESS STEEL SCREWS          |                |
| 208         | 11141224    | M3X16 UNI 5931 STAINLESS STEEL SCREWS         |                |
| 209         | 1114459Z    | M3 UNI 7473 STAINLESS STEEL LOCK NUT          |                |
| 210         | 1114473L    | M3 UNI 5588 STAINLESS STEEL NUT               |                |
| 211         | 1114499Z    | 3,2X7 UNI 6592 STAINLESS STEEL WASHER         |                |
| 212         | 11505420    | IGLIDUR MCM-05-02 CLIP BUSHING                |                |
| 213         | 20920140    | TY-RAP 2,4x92mm RICH.WIT-E-18R FASCIA         |                |

### Exploded drawing



### Component list

| <u>Ref.</u> | <u>Code</u> | <u>Description</u>                           | <u>Remarks</u> |
|-------------|-------------|----------------------------------------------|----------------|
| 001         | 10341630    | PRINTER STAND                                |                |
| 100         | 21430120    | STAMP.PANAS.EPL-1902S2AE(PAN-MEC000200)      |                |
| 101         | 30111340    | SMALL WT01 PRINTER BOARD                     |                |
| 200         | 1110F56Z    | STEAB 5021/3////06 SPACER                    |                |
| 201         | 1110082Z    | TO220 STEAB 5160/12//118 ELM I EM39 ISOLATOR |                |
| 202         | 1110383G    | PZAB 2.2X6.5 UNI 6954 ZN SCREWS              |                |
| 203         | 11141172    | M3X6 UNI 7687 STAINLESS STEEL SCREWS         |                |
| 204         | 1114473L    | M3 UNI 5588 STAINLESS STEEL NUT              |                |
| 205         | 20410020    | ISOLATOR FOR TO220 IN MICA                   |                |



**Component list: WIRING**

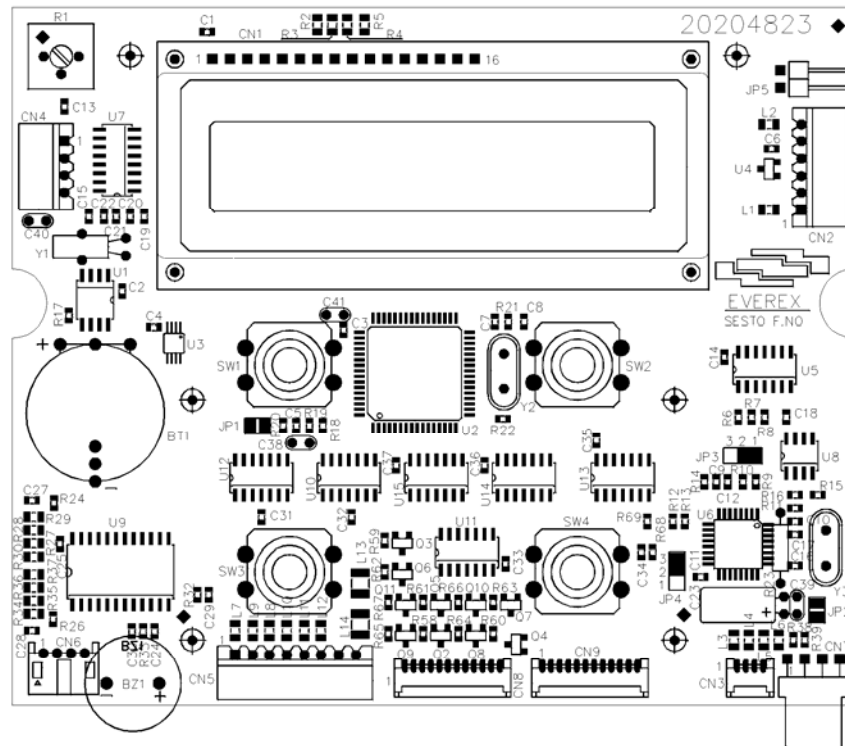
| <u><b>Ref.</b></u> | <u><b>Code</b></u> | <u><b>Description</b></u>                     | <u><b>Remarks</b></u> |
|--------------------|--------------------|-----------------------------------------------|-----------------------|
| 400                | 30120781           | VES-MATIC 10 / EASY SENSOR JUNCTION WIRING    |                       |
| 401                | 30121610           | WIRED PHOTOCELL BOARD                         |                       |
| 402                | 30403020           | WIRED PM35S-048 MOTOR                         |                       |
| 403                | 30120791           | VES-MATIC 10 / EASY CPU-SENSOR WIRING         |                       |
| 404                | 30120821           | VES-MATIC 10 / EASY SERIAL PRINTER WIRING     |                       |
| 405                | 30120800           | VES-MATIC 10 / EASY CPU-INTERCONN. WIRING     |                       |
| 406                | 30120811           | VES-MATIC 10 / EASY PRINTER POWER SUP. WIRING |                       |

## 7. ELECTRICAL DIAGRAMS AND BOARD LAYOUTS

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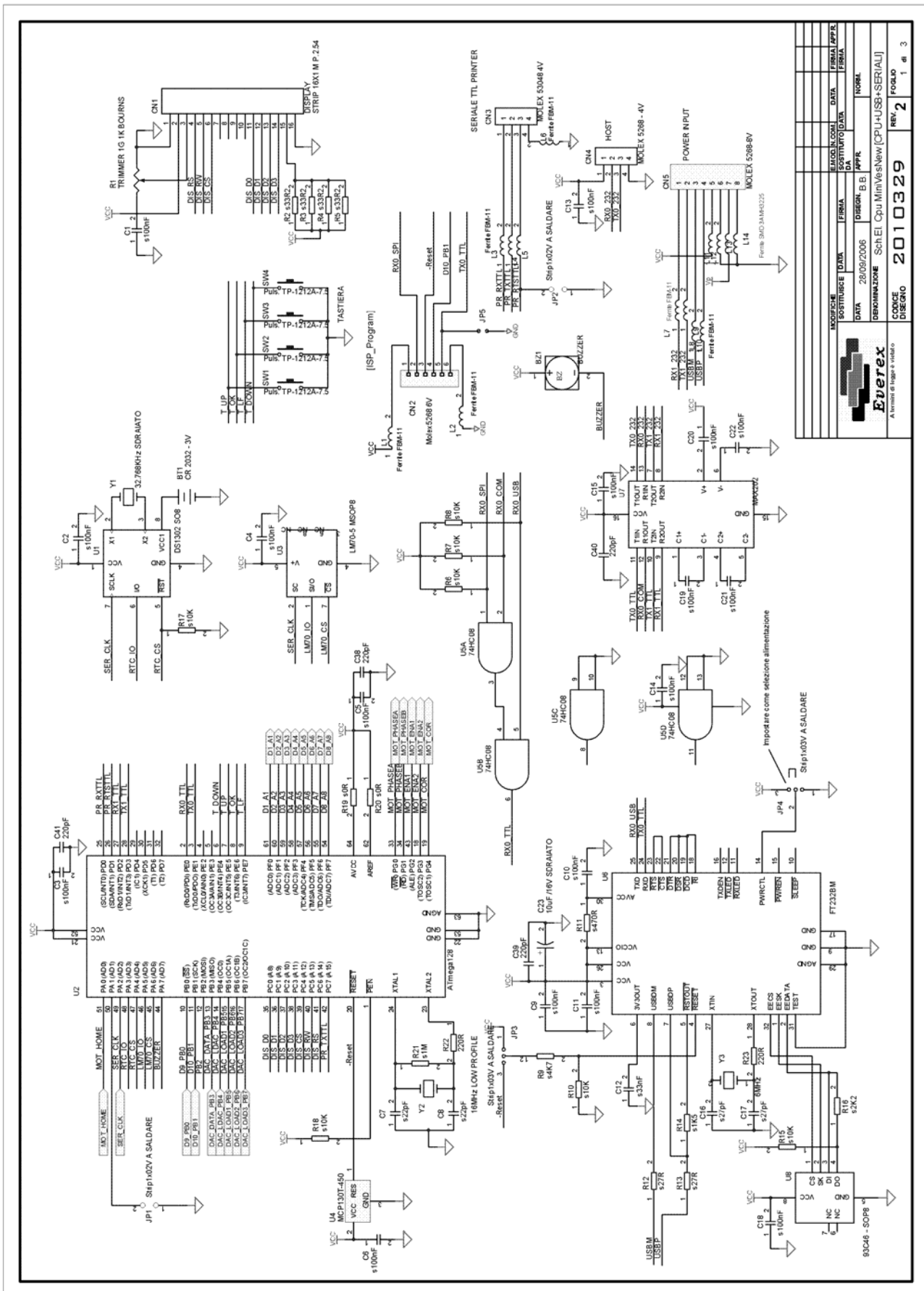
## 7.1. VES MATIC EASY CPU BOARD

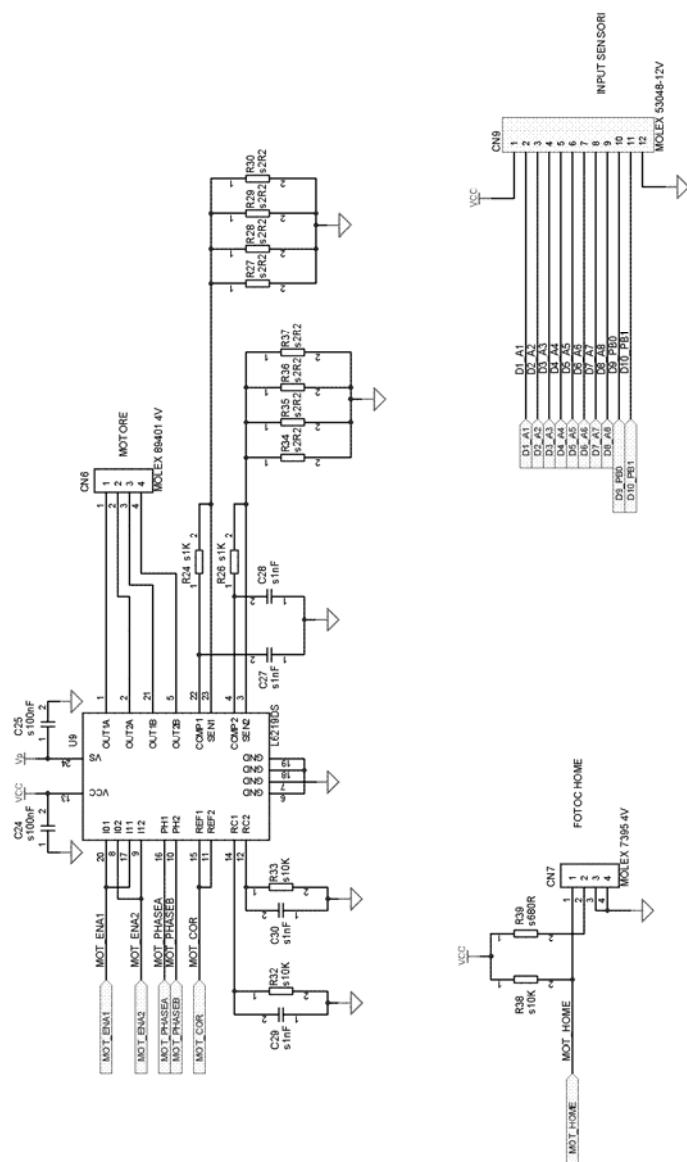
Layout Code 30119871



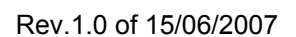
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# Electrical diagram Code 20103292 (Total pages 3)



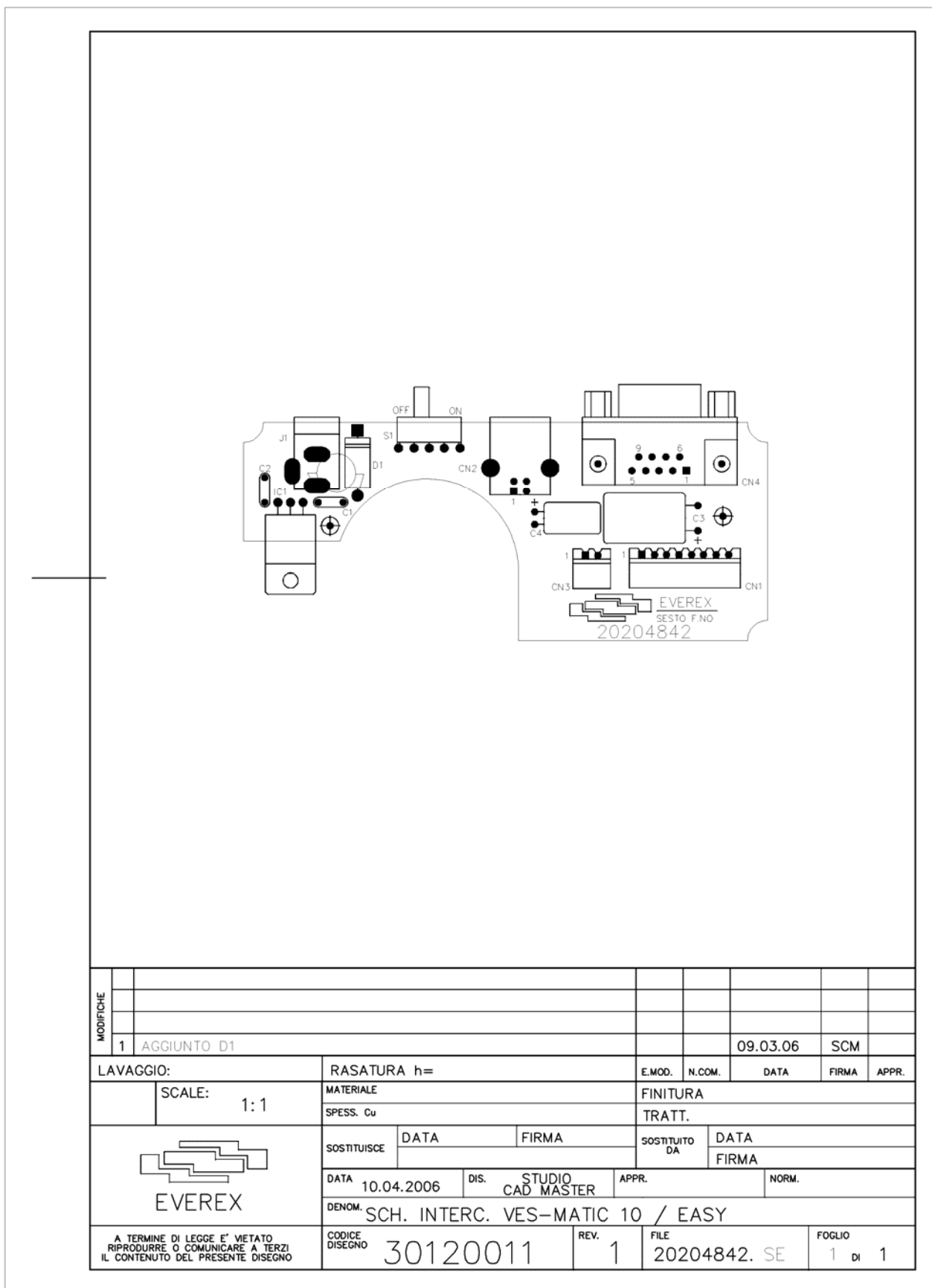


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| A tiratura di 7 fogli e 1 volume                                                    |                       |
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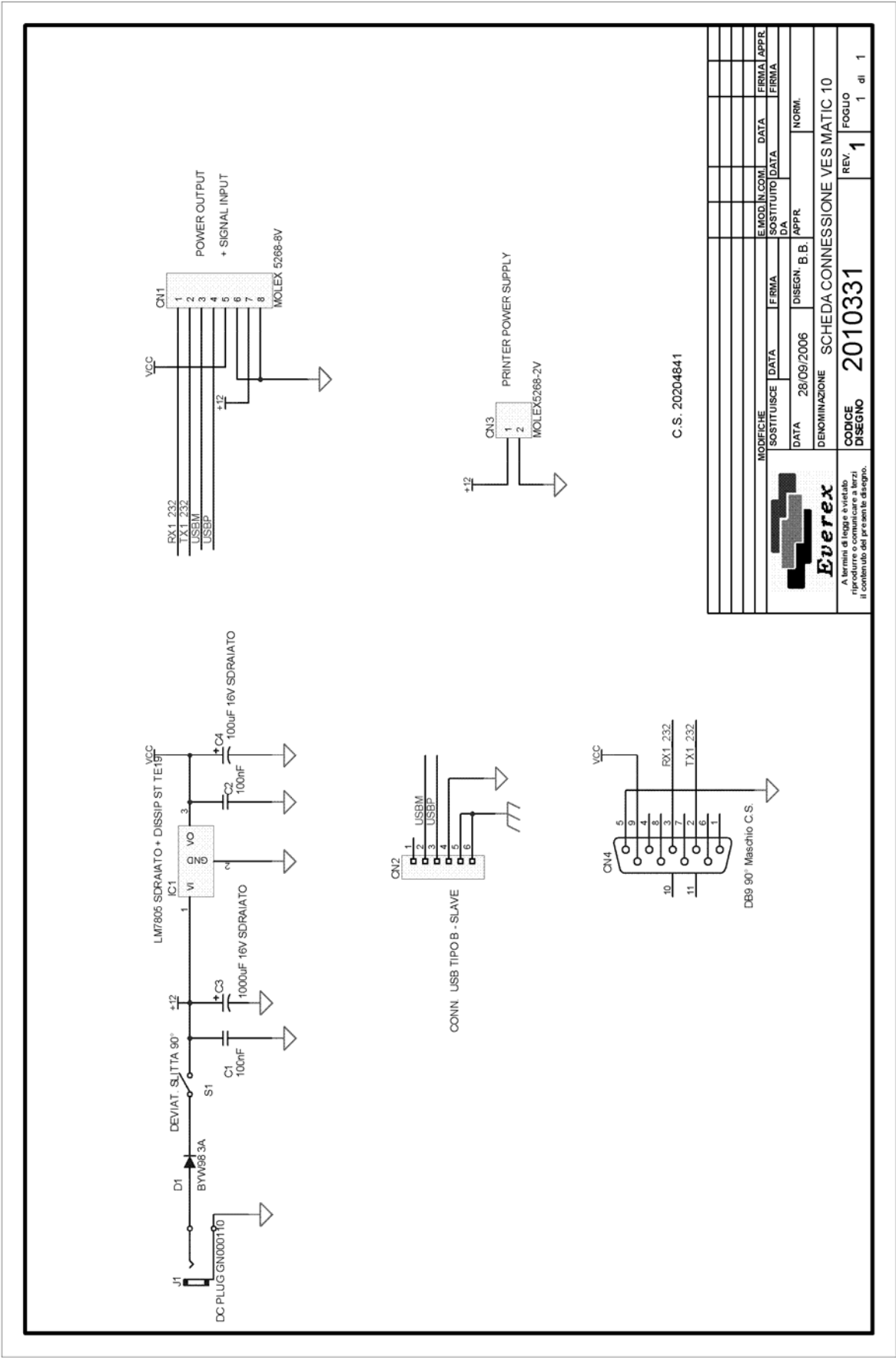


## 7.2. VES Matic EASY CONNECTION BOARD

Layout Code 30120011

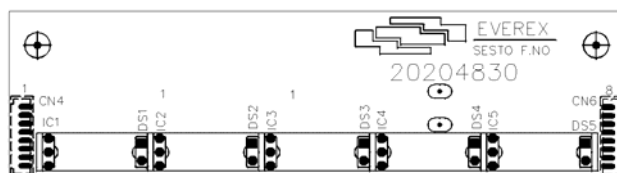


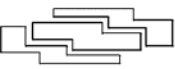
Electrical diagram CODE 20103311



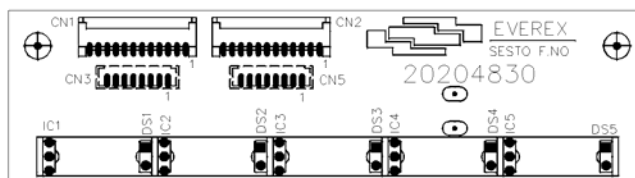
### 7.3. VES Matic EASY FRONT/REAR READ SENSOR BOARD

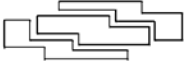
Layout Code 30119990



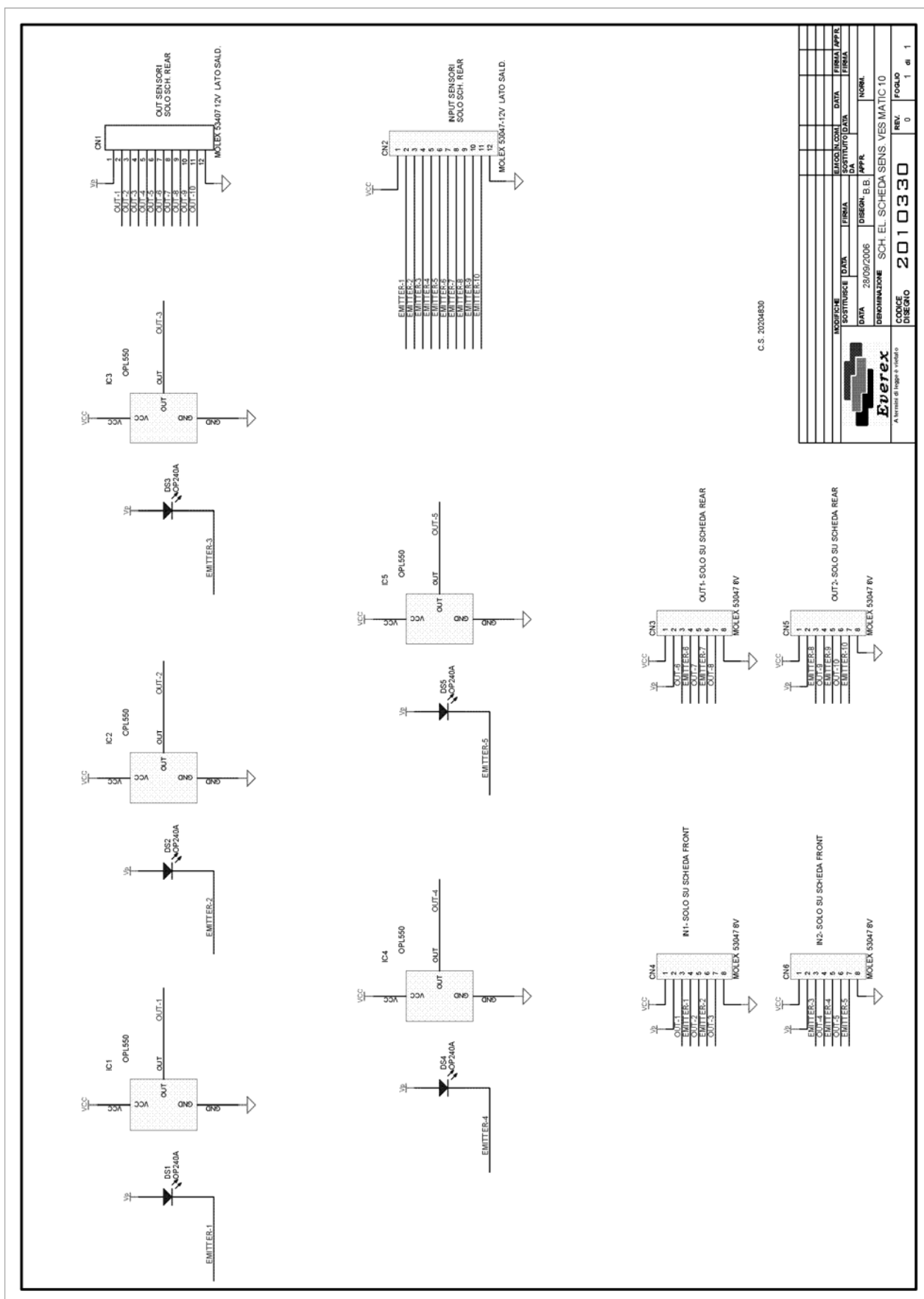
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| MODIFICHE                                                                                            |                                                                                                 |             |                   |               |        |        |              |       |
|                                                                                                      |                                                                                                 |             |                   |               |        |        |              |       |
|                                                                                                      |                                                                                                 |             |                   |               |        |        |              |       |
|                                                                                                      |                                                                                                 |             |                   |               |        |        |              |       |
| LAVAGGIO:                                                                                            |                                                                                                 | RASATURA h= |                   | E.MOD.        | N.COM. | DATA   | FIRMA        | APPR. |
| SCALE: 1:1                                                                                           |                                                                                                 | MATERIALE   |                   | FINITURA      |        |        |              |       |
|                                                                                                      |                                                                                                 | SPESS. Cu   |                   | TRATT.        |        |        |              |       |
| <br><b>EVEREX</b> | SOSTITUISCE                                                                                     | DATA        | FIRMA             | SOSTITUITO DA | DATA   | FIRMA  |              |       |
|                                                                                                      | DATA 24.05.2005                                                                                 | DIS.        | STUDIO CAD MASTER | APPR.         | NORM.  |        |              |       |
|                                                                                                      | DENOM. SCH. SENSORI LETTURA MINIVES ANTERIORE                                                   |             |                   |               |        |        |              |       |
|                                                                                                      | A TERMINE DI LEGGE E' VIETATO RIPRODURRE O COMUNICARE A TERZI IL CONTENUTO DEL PRESENTE DISEGNO |             |                   |               |        |        |              |       |
| CODICE DISEGNO                                                                                       |                                                                                                 | 30119990    |                   | REV.          | 0      | FILE   | 20204830. SE |       |
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## Layout Code 30120000



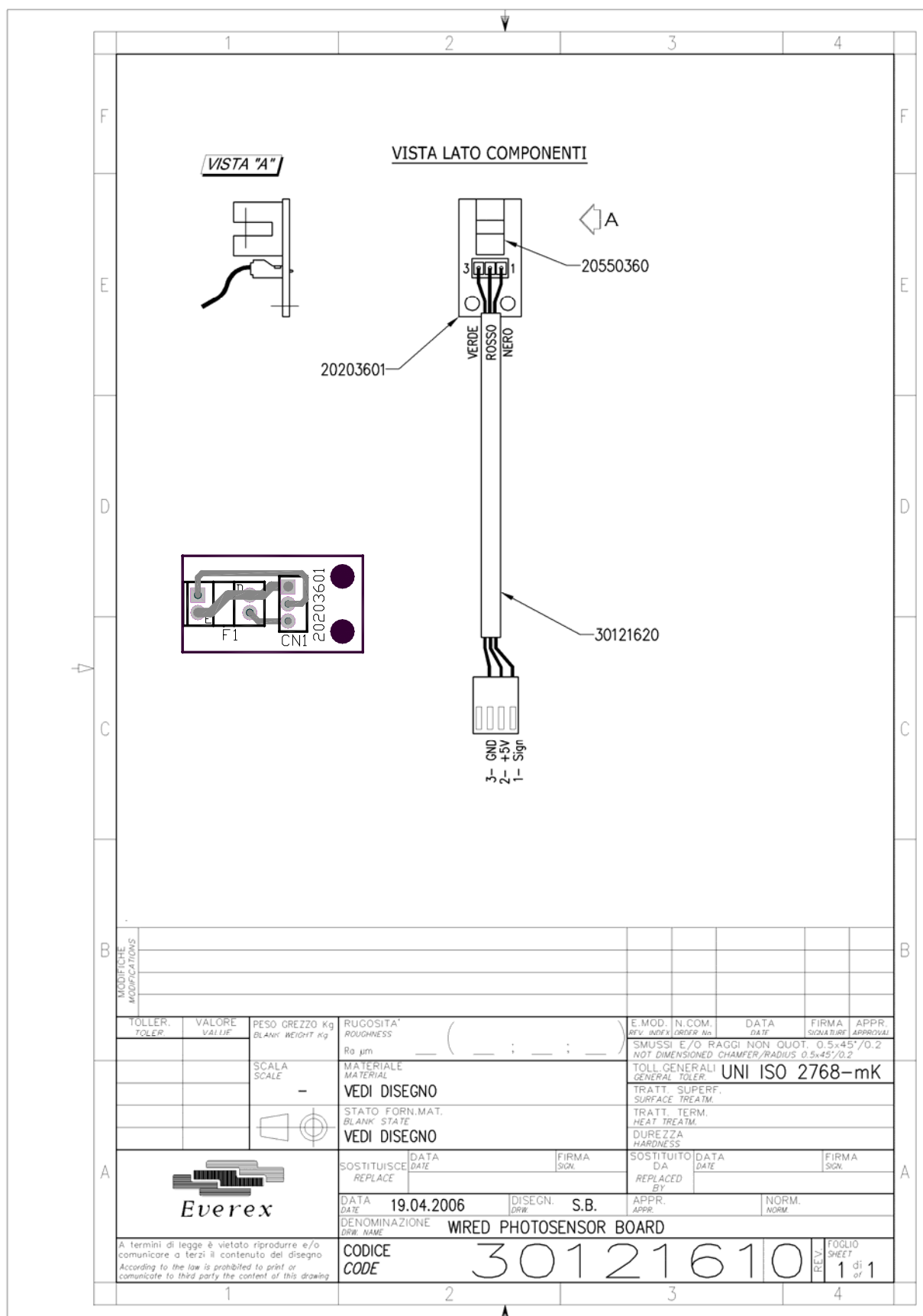
|                                                                                                 |  |                                                |            |          |                   |               |       |       |              |        |        |
|-------------------------------------------------------------------------------------------------|--|------------------------------------------------|------------|----------|-------------------|---------------|-------|-------|--------------|--------|--------|
| MODIFICHE                                                                                       |  |                                                |            |          |                   |               |       |       |              |        |        |
|                                                                                                 |  |                                                |            |          |                   |               |       |       |              |        |        |
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|                                                                                                 |  |                                                |            |          |                   |               |       |       |              |        |        |
| LAVAGGIO:                                                                                       |  | RASATURA h=                                    |            | E.MOD.   | N.COM.            | DATA          | FIRMA | APPR. |              |        |        |
| SCALE: 1:1                                                                                      |  | MATERIALE                                      |            | FINITURA |                   |               |       |       |              |        |        |
|                                                                                                 |  | SPESS. Cu                                      |            | TRATT.   |                   |               |       |       |              |        |        |
| <br>EVEREX   |  | SOSTITUISCE                                    |            | DATA     | FIRMA             | SOSTITUITO DA | DATA  |       |              |        |        |
|                                                                                                 |  |                                                |            |          |                   |               | FIRMA |       |              |        |        |
|                                                                                                 |  | DATA                                           | 24.05.2005 | DIS.     | STUDIO CAD MASTER | APPR.         |       | NORM. |              |        |        |
|                                                                                                 |  | DENOM. SCH. SENSORI LETTURA MINIVES POSTERIORE |            |          |                   |               |       |       |              |        |        |
| A TERMINE DI LEGGE E' VIETATO RIPRODURRE O COMUNICARE A TERZI IL CONTENUTO DEL PRESENTE DISEGNO |  | CODICE DISEGNO                                 |            | 30120000 |                   | REV.          | 0     | FILE  | 20204830. SE | FOGLIO | 4 DI 5 |

## Electrical diagram Code 20103300



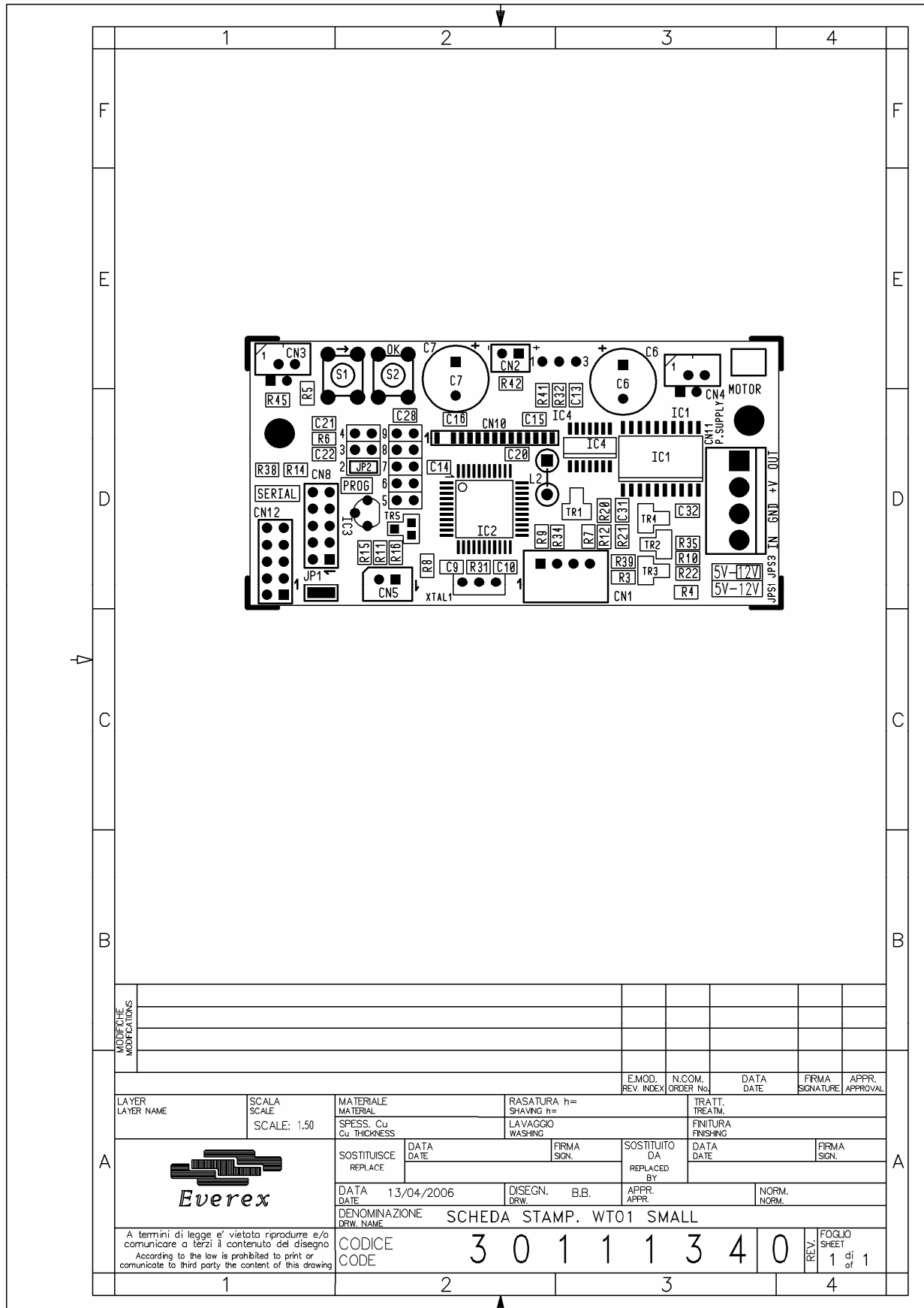
## 7.4. WIRED PHOTOCELL BOARD

Layout code 30121610

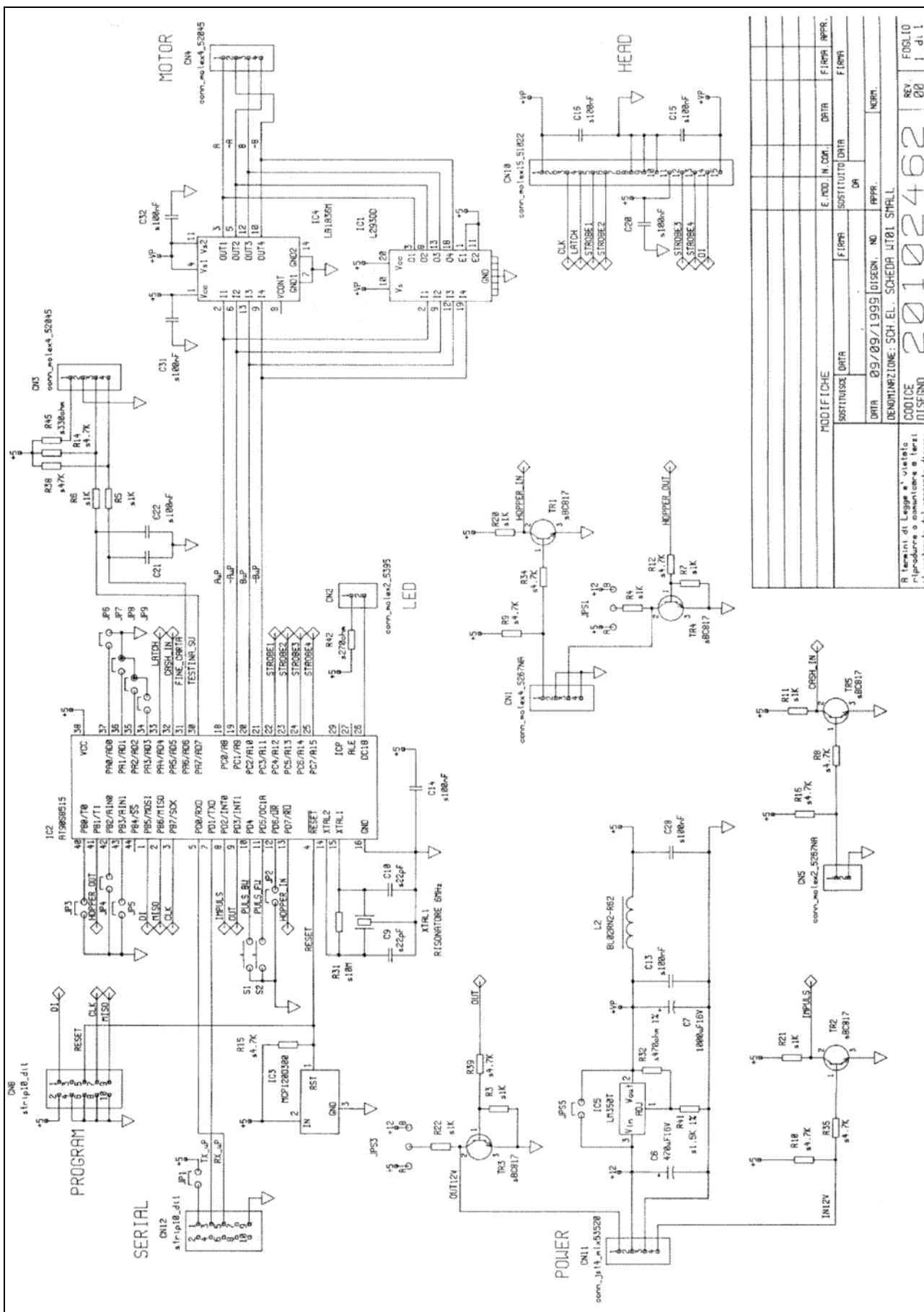


## 7.5. BOARD PRINTER WT01 SMALL

Layout CODE 30111340



## Electrical diagram CODE 20102462





## ATTACHMENT A: EXTERNAL CONNECTIONS

|    |                                                                       |   |
|----|-----------------------------------------------------------------------|---|
| 1. | GENERAL SPECIFICATIONS FOR CONNECTING TO A BARCODE READER.....        | 2 |
| 2. | GENERAL SPECIFICATIONS FOR CONNECTION TO A HOST COMPUTER.....         | 3 |
| 3. | SPECIFICATIONS OF THE ASYNCHRONOUS SERIAL COMMUNICATION PROTOCOL..... | 3 |
| 4. | VES EASY SERIAL COMMANDS AND PARAMETER FORMAT.....                    | 4 |



The cables used for the external connections must not exceed 3 metres in length.

## 1. GENERAL SPECIFICATIONS FOR CONNECTING TO A BARCODE READER

Before connecting the external barcode reader it is recommended checking that:

- This is fitted with a cable with a DB9 female connector in DTE set-up with a 5Vdc 9-pin power supply (refer to the instruction manual of the barcode reader),
- The signals on the DB9 female connector are compatible with the connector installed on the rear of the instrument to which it is connected:

| DB9 Male "EXTERNAL BARCODE" on system rear |                                                      |
|--------------------------------------------|------------------------------------------------------|
| PIN                                        | SIGNAL                                               |
| 2                                          | [Tx] Data transmission towards the reader (not used) |
| 3                                          | [RX] Data received from the reader                   |
| 5                                          | GND                                                  |
| 9                                          | + 5 V                                                |

### TECHNICAL INFORMATION:

- The electrical levels of the signals are of the standard RS232 type.
- The communication is one-way from the barcode reader towards the machine.
- The speed of the transmission is 9600 bit/s; the data format is of the type with 8 data bits, 1 stop bit and no parity bit.
- The communication protocol is of the ASCII type; the barcode read must be terminated with the Carriage Return (0x0d).

- Connect the instrument to the external barcode.  
Use the Barcode Model Z-3080 [Zebex] (or equivalent) with a connection cable type CAB 50607-R9 [Zebex] (or equivalent).



## 2. GENERAL SPECIFICATIONS FOR CONNECTION TO A HOST COMPUTER

It is possible to connect the VESMATIC EASY to a Host Computer via the USB interface, installed on the rear of the instrument.



For connection, use the standard USB cable ['USB 1.1 A-B M/M CABLE' type] supplied with the system. The system is also supplied with a CD-ROM that contains USB drivers for Windows XP and the instructions for installation [Order Code: 22100210] to configure the PC's serial USB port.



### **WARNING:**

In case of any communication problem with the host, check that the COM ID is the same that has been assigned upon installation (sometimes new addresses are assigned to PC ports during subsequent hardware installations).

For the configuration of the hardware of the ID address of the instrument refer to paragraph 3.1.8.

## 3. SPECIFICATIONS OF THE ASYNCHRONOUS SERIAL COMMUNICATION PROTOCOL

A bi-directional serial communication protocol called "NewProtocol" is installed on the VESMATIC EASY instrument (described in the following section).

The speed of the transmission is 19200 bit/s; the data format is of the type with 8 data bits, 1 stop bit and no parity bit.

*Representation of the transit bytes on the serial:*

|     |     |     |     |     |     |     |     |     |    |     |    |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|-----|-----|
| STX | BLK | BLK | LEN | LEN | ADD | ADD | COM | COM | D1 | ... | Dn | ETX | CHK | CHK |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|-----|-----|

Each box represents 1 byte that transits on the serial port, while the pair of bytes will be packed in the memory, meaning that they will return to being 1 byte.

STX : ASCII '>' 0x3E character

BLK : Block number, always = '00' unless for multi-block transferrals (see command 03)

LEN : Number of characters from D1 to Dn inclusive

ADD : ID device (00 and FF = Reserved) Range available 01-7F

COM : ID command

If COM=COM+0x80 the end of the block is given by ETX and CHK is not controlled.

D1.Dn : Date relating to the command

ETX : ASCII 'CR' 0x0D Character

CHK : CheckSum (XOR from STX to Dn inclusive)

*The response to the protocol must come from the receiving device:*

|           |     |     |     |
|-----------|-----|-----|-----|
| ACK / NAK | ADD | ADD | ETX |
|-----------|-----|-----|-----|

ACK : ASCII 0x06 character

If the command block has been correctly interpreted according to the protocol specifications

NAK : ASCII 0x15 character

If the command block fails to comply with the protocol specifications

ADD : ID device

In the case of the translation of the data making the use of additional blocks necessary these will be numbered in an increasing order starting from 0, moreover, every transmission with additional blocks must finish with the block with a length of nil.

#### 4. VES EASY SERIAL COMMANDS AND PARAMETER FORMAT

Every command interpreted obtains as a response 'ACK'=[0x06]+ID+CR

In the case of a syntax error or an incorrect command the response will be 'NACK'=[0x15]+ID+CR

##### 0x00: Request for version

VesMatic EASY responds with an ASCII character string containing the firmware version.

Example of version request to the machine with address 0x00 without checksum verification.

*Example:*

From Host

>00000080+CR+00    The machine with ID '00' is requested to execute command '80' (that is, command '00' without checksum verification)

From VESMATIC EASY

>00100000SW VERS 1.00B +CR+59

##### 0x02: Command requesting machine status

VesMatic EASY responds with a 1-byte message containing machine status information.

If the machine is free, status is 0x00; any other value indicates that the machine is engaged.

Example of machine status request with address 0x00 without checksum verification.

Example:

From Host

>00000082+CR+00 The machine with ID '00' is requested to execute command '0x82' (that is, command '0x02' without checksum verification)

From VESMATIC EASY

>0002000200+CR+33 [FREE]

>00020002FF+CR+33 [ENGAGED]

### 0x13-P: Request for sending of analyses

As a response to this command, the VesMatic10 instrument will send a 160-byte record containing the results of 5 tests.

If parameter P is 0x00, the last 5 tests performed will be sent. If parameter P is 0x01, the 5 previous tests will be sent, and so on. If P is 0x13, the first 5 tests stored in the memory will be sent.

If parameter P exceeds the allowed limits (0x00-0x13), a 1-byte syntax error message (0x01) will be sent in response.

Example of a request for the 5 tests before the last 5, to the machine with address 0x00 without checksum verification and with legal parameter P = 0x01.

Example:

From Host

>0002009301+CR+00 The machine with ID '00' is requested to execute command '93' (that is, command '13' without checksum verification) with parameter '01' indicating the tests requested.

From VES

>00A00013[see description below-160 bytes]+CR+XX

Each 32-byte field containing the results of a test includes the following sub-fields:

E-C-PR-P-T-H-M-S-G-M-A-BC-F1-F2-H1-H2-KI-R1-R2-R3

E (1 byte) Validates the content of the whole field, if its value is zero. If its value differs from zero, the remaining bytes in the field have no meaning.

C (1 byte) Test cycle number.

PR (1 byte) Contains Boolean flags describing test execution methods:

Bit 0 at 0 means normal test, 1 random test.

Bit 1 at 0 means one hour test, 1 two hour test.

If the test is a 1 h test, sub-fields H2 and KI have no meaning.

Bit 2 not used.

|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                               | Bit 3 at 0 means barcode off, 1 barcode on.                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                               | Bit 4 at 0 means display off, 1 display on.                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                               | Bit 5 at 0 means printer off, 1 printer on.                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                               | Bit 6 at 0 means normal print, 1 reverse print.                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                               | Bit 7 at 0 means quality control off, 1 quality control on.                                                                                                                                                                                                                                                                                                                                                 |
| P (1 byte)                                                                                                    | Position where the tests was performed.                                                                                                                                                                                                                                                                                                                                                                     |
| T (1 byte)                                                                                                    | Not used.                                                                                                                                                                                                                                                                                                                                                                                                   |
| H (1 byte)                                                                                                    | Test time (BCD).                                                                                                                                                                                                                                                                                                                                                                                            |
| M (1 byte)                                                                                                    | Test minute(BCD).                                                                                                                                                                                                                                                                                                                                                                                           |
| S (1 byte)                                                                                                    | Test second (BCD).                                                                                                                                                                                                                                                                                                                                                                                          |
| G (1 byte)                                                                                                    | Test day (BCD).                                                                                                                                                                                                                                                                                                                                                                                             |
| ME (1 byte)                                                                                                   | Test month (BCD).                                                                                                                                                                                                                                                                                                                                                                                           |
| A (1 byte)                                                                                                    | Test year (BCD).                                                                                                                                                                                                                                                                                                                                                                                            |
| BC (13 byte)                                                                                                  | Bar code characters.                                                                                                                                                                                                                                                                                                                                                                                        |
| F1 (1 byte)                                                                                                   | Contains Boolean flags describing test results.<br>Bit 0 set means error in one sensor.<br>Bit 1 set means no cuvette in.<br>Bit 2 set means HIGH sample.<br>Bit 3 set means LOW sample.<br>Bit 4 set means EMPTY cuvette.<br>Bit 5 not used.<br>Bit 6 not used.<br>Bit 7 set means that one or more previous bits are set.                                                                                 |
| Note: if one or more bits in sub-field F1 were set, the values shown in fields H1, H2 and KI have no meaning. |                                                                                                                                                                                                                                                                                                                                                                                                             |
| F2 (1 byte)                                                                                                   | Contains Boolean flags describing test results.<br>Bit 0 set means reading at 2 hours greater than reading at 1 hour (sub-field H1 has no meaning).<br>Bit 1 set means reading at 2 hours greater than reference reading (sub-fields H2 and KI have no meaning).<br>Bit 2 set means reading at 1 hour greater than reference reading (sub-field H2 and KI have no meaning).<br>The other bits are not used. |
| H1 (1 byte)                                                                                                   | ESR results at 1 hour.                                                                                                                                                                                                                                                                                                                                                                                      |
| H2 (1 byte)                                                                                                   | ESR results at 2 hours.                                                                                                                                                                                                                                                                                                                                                                                     |
| KI (1 byte)                                                                                                   | Katz Index result.                                                                                                                                                                                                                                                                                                                                                                                          |
| R1 (1 byte)                                                                                                   | Not used.                                                                                                                                                                                                                                                                                                                                                                                                   |

R2 (1 byte) Not used.

R3 (1 byte) Not used.

IMPORTANT NOTE:

VESMATIC EASY responds to commands only when it is not in the engaged status.

BEFORE SENDING THIS COMMAND, SEND COMMAND 0x02 TO MAKE SURE THAT THE VESMATIC EASY INSTRUMENT IS IN THE CORRECT CONDITION TO RESPOND.

**ATTACHMENT B:**  
**UPGRADE SOFTWARE**  
**(PROGRAMMING MANUAL)**

|    |                                                       |    |
|----|-------------------------------------------------------|----|
| 1. | INSTALLING THE PROGRAMMING SOTWARE 'WinBootPrg' ..... | 9  |
| 2. | COPYING THE FILE TO TRANSFER TO THE UNIT .....        | 10 |
| 3. | PROGRAMMING PROCEDURE / UPGRADE SOFTWARE.....         | 11 |

## 1. INSTALLING THE PROGRAMMING SOFTWARE 'WinBootPrg'

The "VESMATIC EASY" CD [Order Code: P30650050] supplied with the system contains the programming software 'WinBootPrg' [Order Code: P22100221] to be used to update the application software.

Connect the instrument to the PC using the USB 1.1 A-B M/M connector [Order Code: P21890360] supplied and install the VCP driver on the PC to configure the USB port (see instructions in the CD-ROM).

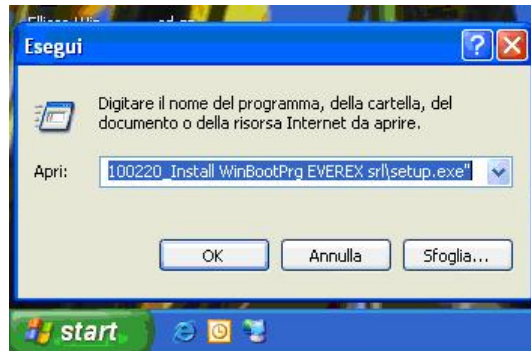
### Accessories required:

Programming the instrument requires a Personal Computer (or a notebook) with Windows®XP operating system and a USB port.

Please, carefully follow the instructions below.

### Installation of the WinBootPrg software:

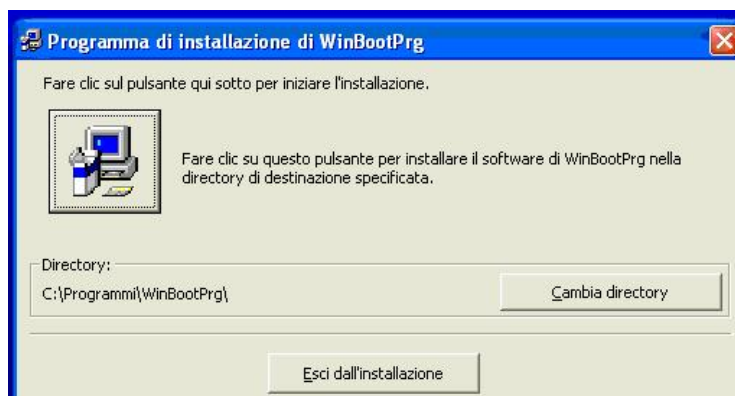
1. Double click the **setup.exe** file in the 22100221\_Install WinBootPrg EVEREX srl folder in the CD-Rom to launch the program.



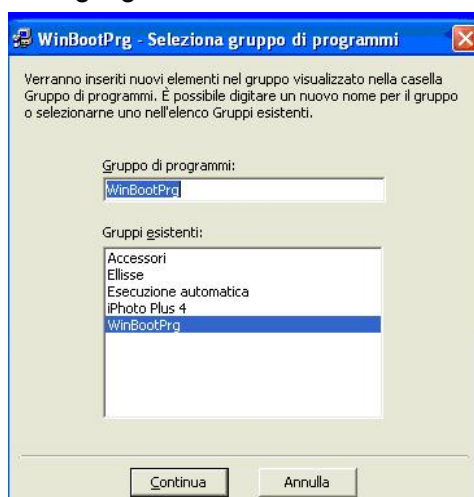
2. Press **OK** to start the installation.



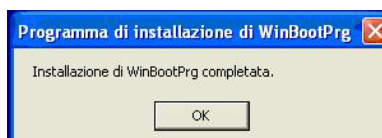
3. By default the program is installed in the **c:\Programmi\WinBootPrg\** folder (if you want to change its destination, press "Change Directory" and choose the new path); press the Start push-button.



4. Confirm the group of Programs highlighted with **Continue**.



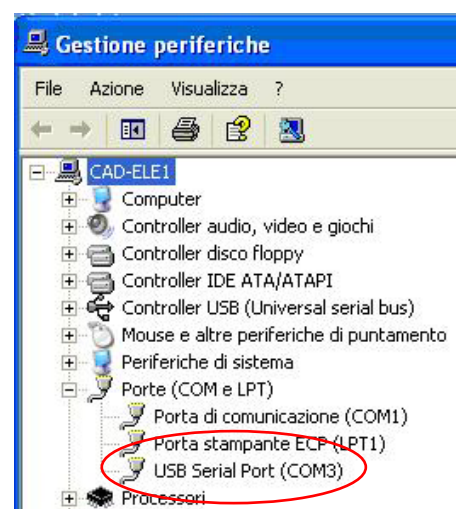
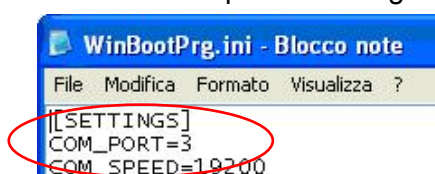
5. When installation is completed, the following message will be displayed '**WinBootPrg installation completed**'; press OK to exit.



## 2. COPYING THE FILE TO TRANSFER TO THE UNIT

Contact the Support Centre for receiving the update file.

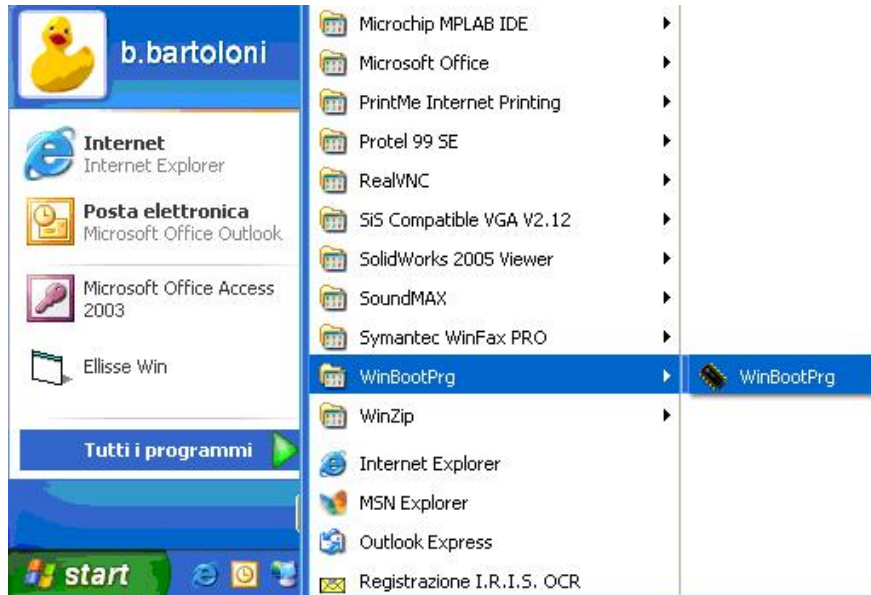
- Copy the application software file (VesMaticEasy\_SWXXX.hex) to be transferred to the VesMatic Easy system in the **C:\Programmi\ WinBootPrg\** folder.
- Connect the system to the PC and to the power supply mains to ensure that the USB port address [COM\_PORT=] in the winbootprg.ini file contained in the WinBootPrg folder corresponds to the USB port address indicated in the system properties [Control panel\System properties\Hardware\Peripheral management ].



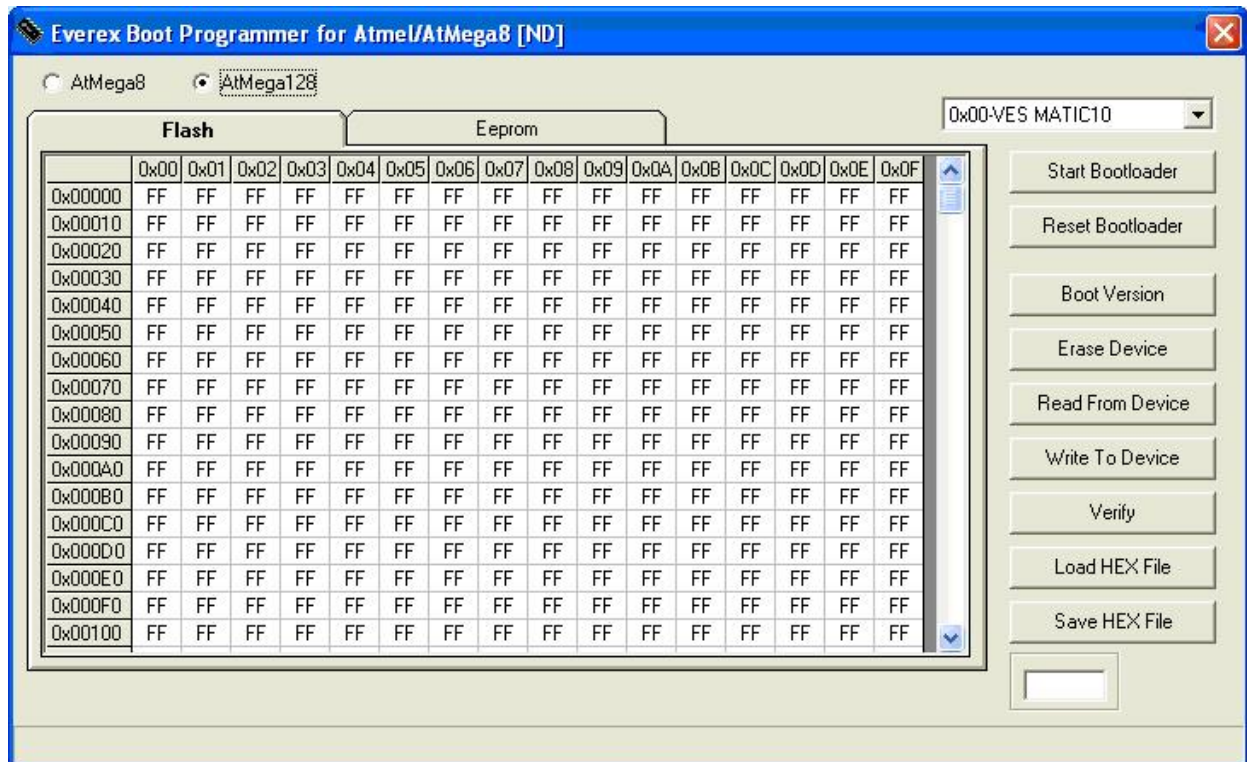
3. If the ports do not corresponds, set the correct port in the winbootprg.ini file and save the new settings.

### 3. PROGRAMMING PROCEDURE / UPGRADE SOFTWARE

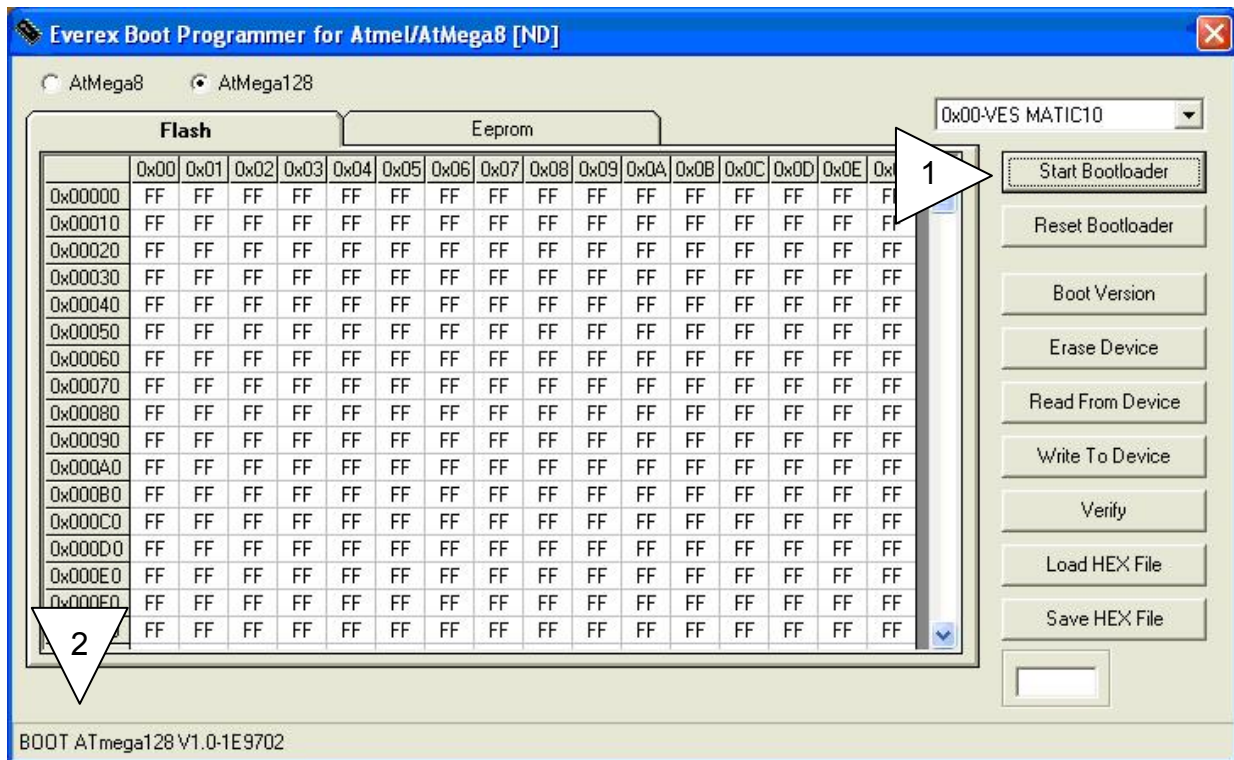
1. Connect the VesMatic Easy to the PC (see Attachment A) and turn it on.
2. Start the WinBootPrg.exe program from the tool bar on the PC:



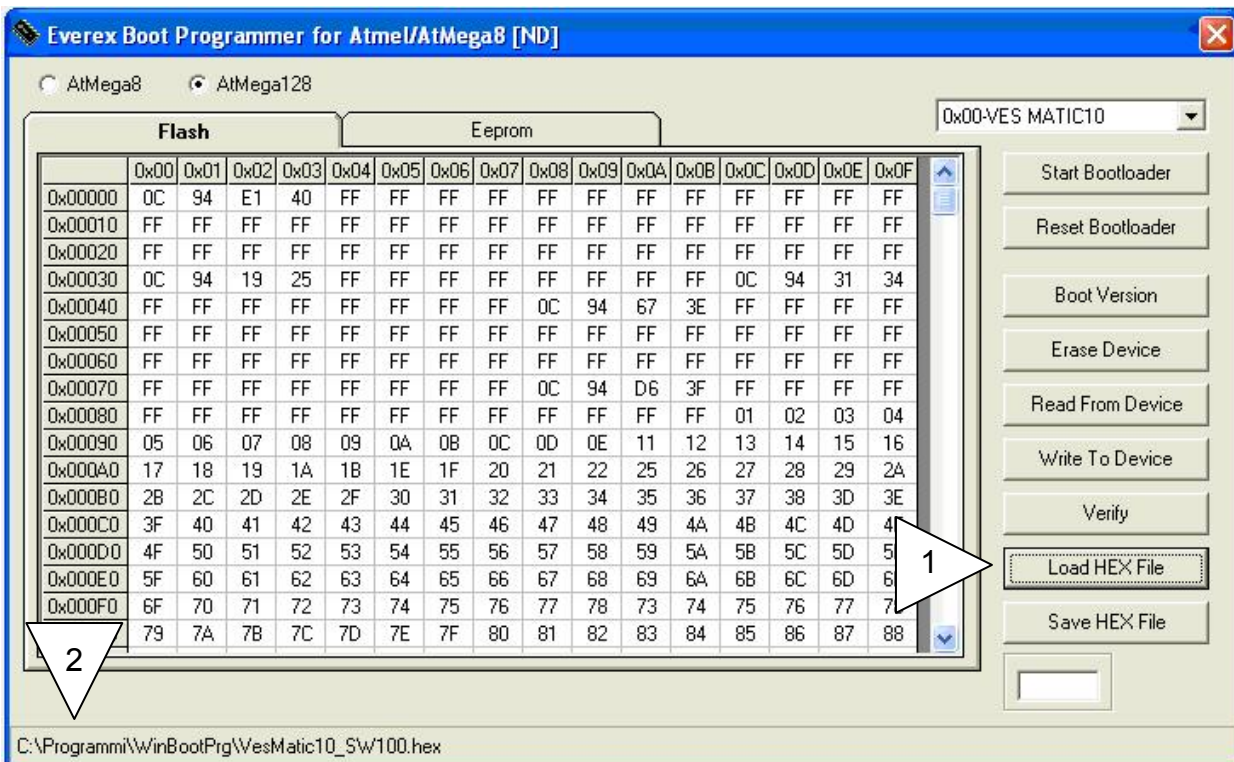
3. During startup, set the program for the microprocessor assembled on the CPU: ATMEGA128.



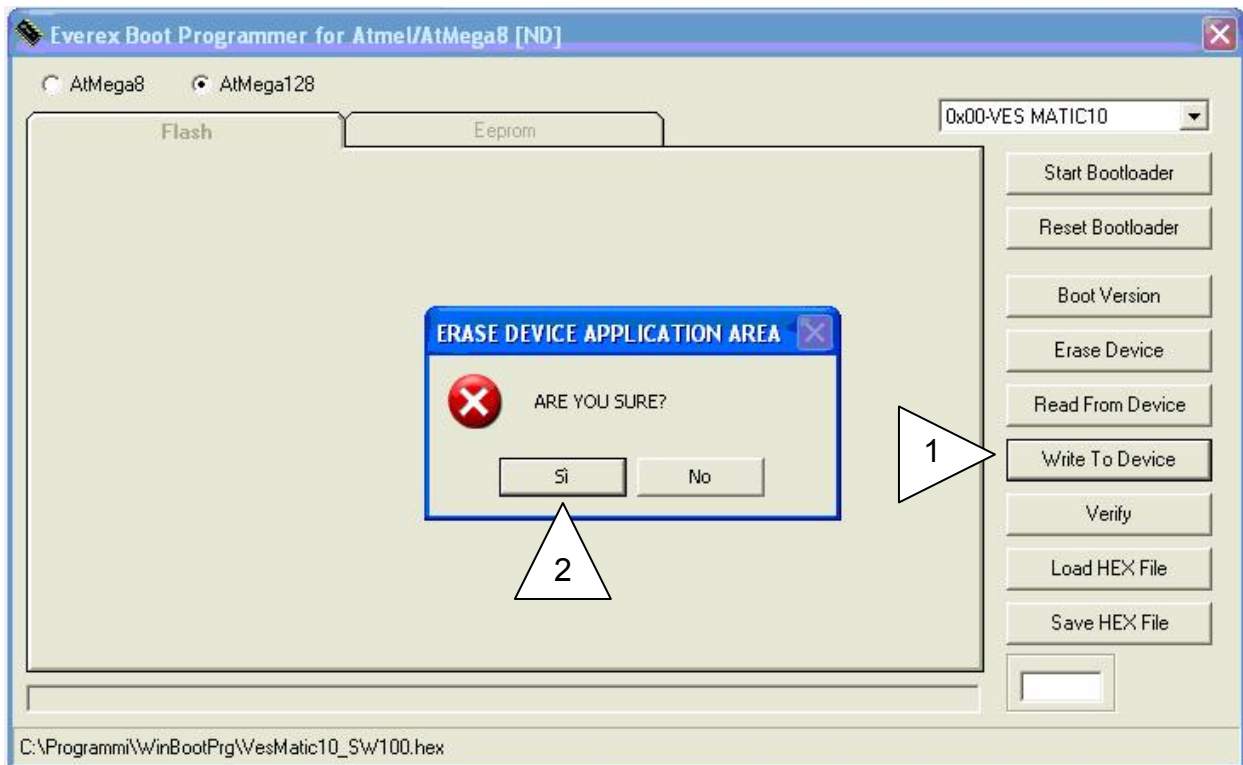
- Ensure that the instrument is shown in the Select Function menu and launch the program in the instrument CPU to update the application software: select the **Start BootLoader** push-button (1) and ensure that the BootLoader program version (2) is shown in the bar.



- Select the application file: press **Load HEX File** (1) and recall the VesMaticEasy\_SWXXX.hex (2) file previously saved in C:\Programmi\WinBootPrg.



6. Start programming the system: select **Write To Device** (1) and, when requested, press **YES** (2) to confirm.



7. When programming is completed, turn the instrument off and on again to ensure that the application software version displayed on screen corresponds to the update version.
8. To exit the **WinBootPrg** program, click on the **X (Close)** in the upper right part of the screen.



# Forms

| <b>Complaint Form</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | DATA <span style="border: 1px solid black; padding: 2px 10px;"> </span>                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Product:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br><b>S/N:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br><b>SW Release:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br>D.D.T. <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br>Date <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br>Warranty YES <input type="checkbox"/> NO <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Customer:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span><br><b>Ref.:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span><br>Address: <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span><br>Phone: <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span><br>Fax: <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span><br>E-mail: <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span> |                                                                                                 |
| LAST TECHNICAL SERVICE on the product:<br>Executed by: <span style="border-bottom: 1px solid black; display: inline-block; width: 200px;"></span> Date: <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| <div style="background-color: #e0ffff; text-align: center; padding: 2px;"><b>DETAILED DESCRIPTION OF THE PROBLEM</b></div> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| <div style="text-align: center; padding: 5px;"><b>COMMENTS FROM THE CUSTOMER</b></div> <div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| <div style="background-color: #e0ffff; text-align: center; padding: 2px;"><b>INSIDE USE ONLY</b></div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 30%;"> <i>Type of complaint:</i><br/><br/><br/> <i>Forward to:</i><br/><br/><br/> <i>Reply Time</i><br/><br/> <i>Reply to</i> <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span> </div> <div style="width: 60%;"> <div style="display: flex; align-items: center;"> <input type="checkbox"/> Shipment<br/> <input type="checkbox"/> Product<br/> <input type="checkbox"/> Technical Service<br/> <input type="checkbox"/> Sales Dept. <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> <input type="checkbox"/> Technical Dept. <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> <input type="checkbox"/> Purchase Dept. <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> <input type="checkbox"/> Quality Management <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> <input type="checkbox"/> <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> <input type="checkbox"/> by <span style="border-bottom: 1px solid black; display: inline-block; width: 50px;"></span> days<br/> <input type="checkbox"/> URGENT </div> <div style="margin-top: 10px;"> Fax: <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span><br/> E-mail: <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span> </div> </div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| <i>Notes:</i><br>To better understand and solve the problem we suggest to:<br>1.Fill this form in alla the parts (except the last one)<br>2. Annex to this form (if available):<br>- all the documentation supplied by the customer (printed reports; pictures etc.)<br>- all the documents supplied by the technical persone (es.settings printout; reports etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |
| Signature <span style="border-bottom: 1px solid black; display: inline-block; width: 150px;"></span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Date <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span> |
| <span style="border: 1px solid black; padding: 2px 5px;">Pag. 1 of</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                 |